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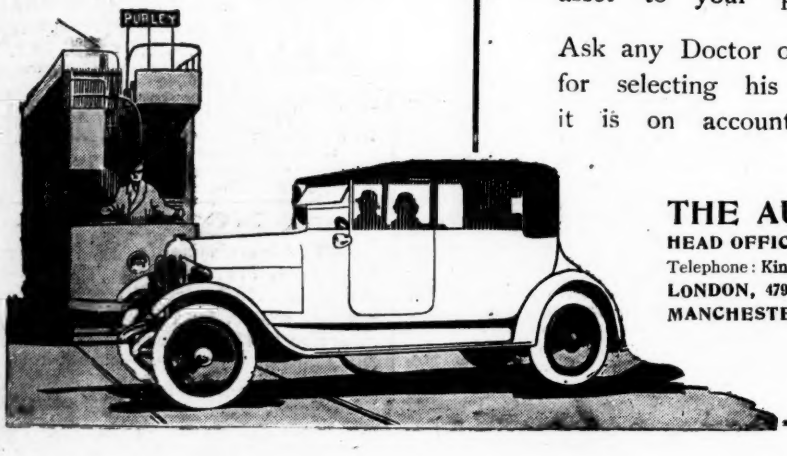

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A Clinical Lecture
ON THE
TREATMENT OF SEPTIC PERITONITIS.*

BY
F. J. STEWARD, M.S., F.R.C.S.,
SURGEON, GUY'S HOSPITAL.

IN recent years there has been a very marked diminution in the death rate from septic peritonitis, and this is no doubt in the main due to better knowledge of the causes of the condition and of the importance of early diagnosis and treatment. There are, nevertheless, still many deaths from septic peritonitis, some of which might, I believe, be prevented by more adequate treatment, and I have for this reason chosen this subject for the present lecture.

I shall first touch upon certain points regarding causation and pathology, and then deal with treatment, and shall describe to you a method of treatment which I have used for the past two years with marked improvement in results obtained.

Septic peritonitis may be produced by a great variety of causes, which may be summarized as follows:

1. *Infection from without* by any form of wound which perforates the abdominal wall.

2. *Infection from within* by traumatic rupture of any hollow viscus, the perforation of ulcers, or by spread of infection from septic processes within the abdomen, such as appendicitis, salpingitis, cholecystitis, and abscesses of various kinds.

3. *Infection through the blood stream*, such as pneumococcal infection.

With such a diversity of causes it is obvious that the type and degree of peritonitis must vary greatly. Consequently it is necessary to make some classification of cases for practical purposes.

It is quite usual to describe cases of septic peritonitis as being either local or general, but the term general is not at all a good one, for it implies something which really very seldom occurs, and it is more in accordance with the facts to use the terms localized and spreading.

Where resistance is high and the infection not very virulent, the area of peritoneum involved quickly becomes limited by a barrier of lymph which produces adhesions between the surrounding structures, the result being a *localized peritonitis*, which may go on to the formation of a localized abscess.

Where, however, resistance is low and the infection a very virulent or massive one there will be little or no attempt at localization and a *spreading peritonitis* will rapidly develop. The area of the peritoneum involved in any given case will depend principally upon the time that has elapsed before the case is operated upon, so that in any early case the peritonitis, although not localized, may yet be local, but in a late case so much spread will have taken place that the condition may approach more nearly to a general peritonitis. There is, however, no hard and fast line between these two types, for the one form may merge into the other; thus a localized peritonitis may, under certain circumstances, become a spreading peritonitis, or peritonitis at first quickly spreading may later become localized by the formation of adhesions. Moreover, the adhesions in such a case may form in different localities, separate localized foci resulting, perhaps, in a number of abscesses being the final stage in a case of acute spreading peritonitis. Some time ago I operated upon a little girl of 5, who was in a desperate condition from a gangrenous appendix. The appendix was removed and much stinking sero-pus let out. There were no signs of adhesions. She did well for a time but relapsed on several occasions and in the end abscesses were opened in the right lumbar region, the left iliac region, and above and to the left of the umbilicus.

Now, what are the pathological results of septic infection of the peritoneum?

They are, in the first place, precisely those associated with inflammation in any other part, but, in addition, there are also special changes which have an important bearing upon treatment. In the first place, a large amount of fluid is poured out, partly as free fluid in the peritoneal cavity, and partly into the tissues of the various organs. This fluid is highly toxic; consequently the patient suffers from an acute toxaemia. Partly owing to this toxaemia, and partly the direct result of irritation of the peritoneum, there is vomiting, which is often very severe and frequent. In the later stages the intestine becomes paralysed and obstruction results, the bowel becoming more and more distended with highly toxic fluid and gas. This in the final stages leads to permeation of the intestinal wall by the organisms in the septic bowel contents, so that a fresh cause of septic peritonitis is added to the original one.

Taken together, these various changes produce in the patient three definite conditions, which must be reckoned with when treatment is instituted:

1. *Loss of fluid* from vomiting, and from the pouring out of fluid into the tissues of the viscera and into the peritoneal cavity.

2. *Toxaemia* due to absorption from the septic peritoneal fluid, and from the septic contents of the bowel.

3. *Intestinal paralysis*, which may pass on to the production of complete obstruction.

TREATMENT.

Bearing the foregoing points in mind, it will be seen that in treating a case of septic peritonitis certain very definite indications can be recognized.

These must be considered separately, and are as follows:

1. To remove the cause.
2. To provide drainage.
3. To make good the loss of fluid.
4. To prevent or treat intestinal paralysis.

Although there can be no doubt as to the advantage of removing the cause of the infection, this should not be a fixed rule never to be departed from, or the patient's life may be sacrificed in carrying it out. For it must be remembered that these patients are many of them very ill indeed, and, above all things, they cannot stand a prolonged operation. In fact, the general condition of the patient must decide. If this is good—in other words, if the case is early—the appendix or tube may be removed or the perforation of an ulcer closed. On the other hand, if the peritonitis is of several days' standing and the patient's condition desperate it may be far wiser to make no attempt to find and remove the cause, except perhaps in the case of a gangrenous appendix which is not tied down or difficult to reach.

The second indication is to provide drainage. Now successful drainage is, I venture to say, the crux of the whole question, for the peritoneum is so tolerant and its reparative power so great that if drainage is efficient improvement as a rule commences at once.

Numerous devices are employed, and their very number is an index of the uncertainty of their efficacy. The following may be considered:

Tubes.

It is obvious that if an abscess has to be drained the simplest and most efficient plan is to make an opening in such a position that the cavity is kept empty by the action of gravity. It is equally obvious that a collection of pus in the abdomen, and especially in the pelvis, cannot be efficiently drained by a tube passed into the cavity through an opening in the anterior abdominal wall. No actual drainage will be accomplished in that way, although a small amount of advantage no doubt does result in two ways—for the tube, in the first place, acts as an overflow pipe, so that tension is relieved and the size of the cavity is no longer an increasing one; and, in the second place, the respiratory movements help by pushing the fluid up the tube.

Nevertheless, this quite inefficient plan is by no means infrequently adopted, and I have seen not a few patients dying from septic peritonitis with one or more drainage tubes full to the brim of foul fluid sticking out through openings in the anterior abdominal wall.

A short time ago I was reading an article written by a well-known surgeon. He describes a case of pelvic appendicitis in which at the operation "offensive purulent fluid welled up from the pelvis," and goes on to say, "a large drainage tube was left in the pelvic cavity." Five days later a second operation was performed for paralytic obstruction, and "the lower three feet of the ileum were

* Delivered at Guy's Hospital, December 17th, 1919.

found to be acutely inflamed and in a state of paralytic collapse."

This account clearly proves that the pelvis was not efficiently drained by the tube, or there would have been no peritonitis five days later, and therefore no paralytic obstruction. A tube may, however, at times be used to advantage if it can be placed in such a position that it will drain a given site with the help of gravity—for instance, through a stab wound in the right loin to drain the kidney pouch. Used in this manner there is nothing more efficient, but, as a general rule, a tube passed from the anterior abdominal wall into the pelvis or elsewhere is, by itself, entirely unsatisfactory.

In order to help matters where tubes are used in this way the plan of sucking them out from time to time by means of a syringe is sometimes adopted, but I cannot say that this has given much satisfaction.

Gauze Drains.

Gauze drains, either in the form of large tampons or as cigarette drains formed of gauze within a rubber tube, are very commonly used. Here the suction action of capillarity is made use of to counteract the effects of gravity, and often with considerable success, but if the amount of fluid is large the gauze soon tends to become blocked and sodden and no longer acts efficiently, so that it must be frequently changed, and herein lies the chief objection to its use.

Continuous Irrigation.

Since, owing to the physical conditions present, drainage in the ordinary sense is so difficult, it is reasonable to attempt to bring about the same effect by other means, such as continuous irrigation. This acts in at least two ways, for it not only washes the pus away but it dilutes it and so diminishes its toxicity. Two years ago I first began to employ the following method of irrigation, and I may say at once that I am more than satisfied with it, for although I have used it in a number of extremely bad cases, some of which I shall describe, the result has in every case been successful.

The method adopted is as follows: After the bulk of the pus has been gently mopped up with gauze sponges, several Carrel tubes are passed into the abdomen in different directions, one or more being carried down to the bottom of the pelvis. A large-bore rubber drainage tube is also carried down to the bottom of the pelvis and fixed to the lower part of the abdominal incision by a fishing-gut suture.

The upper part of the incision is partially closed with sutures, then lightly packed with gauze, which surrounds the tubes, and a large dressing applied. The patient is propped up in bed in the Fowler position with a bedpan beneath him, large wool pads intervening. The Carrel tubes are connected up with a saline bag with a drop regulator in the circuit, and warm normal saline solution is allowed to drip continuously at about the rate of a drop a second. At this rate the amount run in in twenty-four hours is nine pints, which, as far as one can judge, appears to be a sufficient quantity. The irrigation is continued usually from three to six days, according to the condition of the patient. The large tube and all the Carrel tubes excepting one are then removed, the one Carrel tube remaining in the pelvis a few days longer.

The striking rapidity with which the patients thus treated have shown signs of improvement is clear proof of the efficacy of the treatment, for in all of them vomiting has quickly ceased, in a few hours the general condition has improved, and up to the present no case has had any marked degree of intestinal paralysis.

The loss of fluid in these cases of septic peritonitis is very great, and it is of first-rate importance to lose no time in taking measures to replace it. This may be done by saline infusion either into a vein or into the subcutaneous tissue of the axillae, or per rectum.

Axillary infusion should be commenced as soon as the patient is partly under the anaesthetic and continued during and for some time after the operation. In very bad cases the intravenous method is better because more rapid, for the fluid very quickly leaves the circulation and thus replenishes the loss of fluid from the tissues. After the patient is back in bed rectal infusion should be started and continued until vomiting has ceased, when fluid can be given by the mouth.

Paralysis of the intestine is always present in great or less degree in bad cases. If it has not become a serious feature, as judged by the character of the vomit, and the appearance of the intestine at the time of operation, it will usually pass off if drainage is efficient, but in order to assist the process pituitrin in doses of ½ or 1 c.cm. should be given every six hours according to the age of the patient, and, after four doses, this should be followed up with a turpentine enema. In severe cases, however, the most distended coils should be incised and emptied of their contents at the time of operation. Several lengths of small intestine can be quickly emptied in this way and the incisions closed by one or two fine sutures.

Such are, in general, the main indications and the means of meeting them. I shall now describe certain points regarding the practical application of these principles to actual cases.

Many patients suffering from severe septic peritonitis are in a state of collapse when first seen, often owing to being moved some distance to the hospital. No harm will be done in such a case by a short delay before the operation is performed in order that methods of resuscitation may be applied. These consist in the application of warmth, a hypodermic injection of morphine and atropine, and the administration of fluid in the form of rectal or subcutaneous saline.

At the end of an hour the general condition of the patient will usually be so much improved that the operation may be safely proceeded with. In these critical cases details count for much and an apparently small point may make all the difference. Care must be taken, therefore, in the first place, to avoid chilling, the patient's limbs must be warmly clad, the theatre warm, and, if possible, the table specially heated. The patient, already in a toxic condition, must not be unnecessarily poisoned by the anaesthetic, chloroform must therefore be avoided and either gas and oxygen or warm ether vapour given. I do not advise spinal analgesia in these cases, as this involves turning the patient on to the side and back again, a course that must be liable to do harm. Moreover, the fall of blood pressure so often seen during spinal analgesia would be at any rate very serious and might be fatal.

As regards the operation itself, this will vary according to the condition present, and the following types of case may be considered.

A. *Cases Not Requiring Drainage.*

Bearing in mind the fact that the peritoneum is capable of dealing with a considerable degree of infection without harm resulting, one can, in certain cases of early septic peritonitis, be satisfied with removing the cause of infection without drainage, the abdominal wound being completely closed.

For instance, cases of perforation of gastric and duodenal ulcers, if operated upon within eight hours of the catastrophe, may usually be safely treated in this manner, provided that the perforation can be securely closed and the peritoneal cavity efficiently cleansed of escaped gastric or duodenal contents by irrigation with a large quantity of warm saline.

Again, during operation upon certain cases of acute appendicitis the question of drainage or closure of the wound without drainage arises.

Consideration of the following points will help in arriving at a correct decision.

1. *The Character of the Fluid Present.*—If this is only slightly turbid and does not smell much, it may be gently mopped out and the wound safely closed; but if the fluid is thick and more approaching to pus and is foul-smelling, the safer plan will be to drain.

2. *The Condition of the Patient.*—A healthy young adult, whose general condition shows that he is putting up a good resistance to his infection, as indicated by good colour and pulse and a temperature raised a few degrees, may usually be safely treated by complete closure of the wound; but in the case of children whose resistance to peritoneal sepsis is notoriously so poor, in old people, and when the general condition is not good, it is far better to play for safety and provide some adequate form of drainage for a few days.

The following case is a good example. The patient was a healthy boy of 16, in good condition, who was admitted to hospital on November 11th, 1919, for acute abdominal pain of three days' duration. He was tender

and rigid in the right iliac region, his pulse was 104, and temperature 100.2°. At the operation the appendix was found swollen and congested, and there was some fluid in the pelvis, slightly brown but clear. This was mopped out and the wound closed without drainage, except for a gauze wick in the subcutaneous tissue. The patient made an uninterrupted recovery.

B. *Cases Suitable for Gauze Drainage.*

In the next group of cases the area of involvement of peritoneum is small in extent, but there is usually considerable lymph deposit and the fluid is purulent. The causal factor in these cases is usually an inflamed and possibly gangrenous appendix or an inflamed Fallopian tube. In such cases, after removing the appendix or tube, I pack the infected area with sterile gauze tampons, bringing the ends out at one end of the wound, closing the rest of the wound with a few temporary sutures.

After three days, if the patient is doing well, an anaesthetic is given, the tampons removed, and the wound closed completely. The great advantage of this plan is that the wound heals per primam, so that the risk of ventral hernia is disposed of, and, moreover, much time is saved. It may be objected that the second anaesthetic and second operation here advised would be avoided by simply draining the cavity, but to my mind the advantages already mentioned clearly outweigh this objection, and, further, the anaesthetic affords an opportunity of thoroughly inspecting the parts, and thus of detecting early and dealing with any separate collection which may be forming.

C. *Late Cases.*

We now come to those late cases in which a large area of peritoneum is involved in a spreading peritonitis, the cases so often wrongly labelled general peritonitis. If the cause is a perforated gangrenous appendix, as frequently happens, it can be removed, but in other cases the cause may not be discovered at the operation, often because the patient's condition is so desperate that any extended search is out of the question. These are the cases in which the method of continuous irrigation I have already described to you is so valuable. Here are some cases which illustrate the practical application of the method.

CASE I.

Rose W., aged 29, was admitted into Guy's Hospital on April 4th, 1918. She had not felt well for some months, and ten days before admission became very ill with pain in the abdomen and legs and constant vomiting. She became steadily worse, and on admission was in a condition of collapse, with a rapid running pulse and subnormal temperature. The abdomen was somewhat distended, did not move on inspiration, and was rigid and tender all over.

Operation was performed immediately, a median incision evacuating a large quantity of foul pus which filled the pelvis and the lower part of the abdomen but appeared to be partially shut off by omental adhesions above. As the patient was too ill to permit of any search being made for the source of infection, the pus was as far as possible rapidly mopped up and the wound partially closed. Several Carrel tubes were introduced in different directions, one going to the bottom of the pelvis, and with it a large-bore drainage tube for return flow as already described.

The patient remained in a critical condition for several days and then slowly improved. The continuous irrigation was kept up for eight days, and as there was then very little discharge the tubes were removed. A small collection subsequently formed, and was evacuated spontaneously through the wound on the nineteenth day after operation. Apart from this, progress was uninterrupted, and the patient was discharged well on May 23rd.

CASE II.

Annie S., aged 7, was admitted on October 1st, 1918, after four days' illness, with symptoms of appendicitis. The child was obviously very ill and presented a typical picture of spreading peritonitis in an advanced stage.

At the operation the appendix was found to be gangrenous and perforated, the lower part of the abdomen, so far as seen, and the pelvis were full of foul pus, and there was practically no sign of lymph or limiting adhesions. The irrigation treatment already described was adopted and the child soon began to show signs of improvement, but the pulse remained rapid and the temperature continued to swing for several weeks. Four weeks after admission a subphrenic collection on the right side was evacuated, and a few days later signs developed at the right base and proved to be due to a localized empyema, which was drained. Moreover, a faecal fistula formed at the site of the original incision and did not finally close for over two months. However, the child eventually recovered completely and left the hospital in good health on January 16th, 1919.

CASE III.

A man, aged 37, was admitted on January 6th, 1919, having been ill for six days with pain in the lower part of the abdomen and continuous vomiting. The abdomen was distended, rigid, and tender all over, these signs being of maximum intensity in the right lower quadrant. At the operation the appendix was found to be gangrenous and perforated, and free pus was present in the abdomen and pelvis with absolutely no evidence of adhesions.

The general condition of this patient was not so serious as that of the other two, and he improved more rapidly. The irrigation was continued for five days, and after this there was very little discharge, healing being complete at the end of four weeks.

The next case was operated upon by my surgical assistant, Mr. Slesinger, who has kindly supplied me with the following notes.

CASE IV.

J. C., a woman aged 16. No previous attacks. On December 3rd began with abdominal pains and diarrhoea. On December 6th vomiting began accompanied by constipation. Pain became worse, and tended to settle in the right iliac fossa. Vomiting and constipation continued until admission on December 10th.

On admission, pulse 130, temperature 102.4°, respirations 30. Abdomen rigid, distended, and immobile. Tender all over, particularly in right iliac fossa. Tongue dry and furred; well-marked abdominal facies.

Operation December 10th: appendix incision. Appendix gangrenous at base, with perforation of caecum where it was attached discharging faeces. Generalized peritonitis with no signs of adhesions, and quantities of pus everywhere. Appendix removed, and four Carrel tubes—two into pelvis, one across abdomen towards the left, and one towards the liver—inserted, tied to large drainage tube, running down to pelvis. Axillary saline during operation, and rectal saline sodium bicarbonate given later. Continuous saline drip into peritoneum for four days. Attempt to keep pelvis dry by capillary vacuum suction apparatus.

Bowels open with enema on second day and daily after with liquid paraffin. Tongue moist on third day, no vomiting, pulse and temperature settling, abdomen much more supple; general condition very good by fourth day.*

The above cases sufficiently illustrate the method, which I may say has been applied in a large number of other cases with similar results.

Treatment after the operation consists in keeping the patient propped up in the Fowler position, as this helps to prevent spread of infection upwards towards the diaphragm and chest, the administration of saline per rectum or subcutaneously, and injections of pituitrin to overcome the paralysis of the bowel. Sleep very often does not come easily to these patients, owing partly to the position and partly to general discomfort, for there is not usually much actual pain subsequent to the operation. I am sure it is unwise to give morphine if it can be avoided, and as a matter of fact sleep can usually be obtained by other means. I find that medinal gr. 10 or dial gr. 1½ are most useful, and if there is vomiting either can be given with 15 or 20 grains of aspirin in a small rectal saline, and this combination usually acts well. Failing these, heroin gr. $\frac{1}{12}$ or omnopon gr. $\frac{1}{3}$ should be tried before morphine is given, and one or other will usually succeed.

Under this treatment the patient usually does well, and this will be evidenced by dropping of the pulse rate, cessation of vomiting, and cleaning of the tongue.

Complications.

From this time on a sharp look-out must be kept for the onset of complications. The most likely complications are the following:

1. *Cardiac Failure.*—In elderly patients and in the subjects of organic disease an operation for septic peritonitis, although apparently successful for twelve or even twenty-four hours, is liable to be followed by heart failure which almost always is fatal. The patient, who may be otherwise doing well, becomes restless and perhaps a little delirious, and with this the pulse is noticed to be less strong and more rapid, and soon the extremities show signs of becoming cold. In such a case you will, of course, apply the usual remedies—warmth, pituitrin, camphor, and so forth—but they are not likely to be successful.

2. *Paralytic Ileus.*—I have already mentioned that there is always some paralysis of the intestine involved in peritonitis. With appropriate treatment this will usually pass

* This patient died two weeks after this lecture was delivered. She did well for a time, but subsequently developed an empyema and a number of intraperitoneal collections.

off, but sometimes, and especially in cases operated upon late and where the drainage is not really satisfactory, the paralysis after a time gives place to definite obstruction which is accompanied by all the results met with in cases of mechanical obstruction of the intestine. The bowel above the paralysed part becomes distended more and more, and finally the wall becomes sodden and no longer prevents the passage of organisms from the inside, so that a fresh cause of peritonitis may in this way be added to the original one. All this is accompanied by persistent vomiting, first of duodenal and later of intestinal contents, increasing abdominal distension, and a rising pulse rate.

The management of these cases is no easy matter, for it is difficult to say at any given moment whether or no the condition present is due to a degree of paralysis that will pass off or whether the condition has already passed this stage. Moreover, much depends upon the determination of this point, for on the one hand needless secondary operations must be avoided, and on the other hand it is important not to waste valuable time.

Unfortunately, I can give no very definite rules for your guidance, but the progress of the case and the results of treatment are the data upon which opinion must be based.

If several doses of pituitrin followed by enemata result in the passage of flatus, all will probably be well, but if vomiting continues, and no flatus is passed, in spite of these measures, and if, further, the enemata are retained entirely, the outlook is usually bad, and in this case the abdomen should be reopened under gas and oxygen, and several of the most distended coils of intestine opened, and thoroughly emptied of their contents and closed again. Except in the most advanced and hopeless cases this treatment will relieve the condition.

3. *Local collections* frequently form after a spreading peritonitis has been successfully relieved by suitable treatment, and must be carefully watched for.

The danger signal is usually a rise of temperature, and in the presence of this indication careful and repeated examination must be made for local areas of resistance and tenderness, not forgetting rectal and vaginal examination for collections in the pelvis.

If evidence of a collection is found there need not be too much haste to attempt to evacuate it, provided the general condition of the patient is good, for it is not always easy to find a small subphrenic abscess or a collection amongst coils of intestine, and, moreover, the attempt to do so may result in the formation of a faecal fistula from tearing a coil of softened intestine while separating adhesions. Again, there is no doubt that small collections may be absorbed, for a tender lump associated with a rise of temperature may persist for some days and then gradually disappear, especially in the later stages of convalescence. It must be remembered also that empyema is not an uncommon complication of septic peritonitis, so that the chest must be carefully examined from time to time, especially if the temperature continues to swing. This is illustrated in the second case I described to you, in which there was first a subphrenic collection and later an empyema.

4. *Faecal fistula* also complicates a certain proportion of these cases, and is due sometimes to the separation of a gangrenous appendix, at others to pressure from a hard drainage tube too long retained, and occasionally from the giving way of the wall of the caecum when greatly distended and exposed in the wound. In the majority of cases the fistula will close in course of time, but in a few the mucous membrane becomes continuous with the skin and a secondary operation is needed later.

Finally, *ventral hernia* must inevitably occur as a late complication in many cases, and may require an operation for its cure.

A COURSE in dermatology and venereal diseases, open to foreign as well as French graduates, is about to begin in the Faculty of Medicine, Strasbourg. It will consist of forty clinical and ten laboratory demonstrations. It will begin on May 1st and terminate on July 14th. Full particulars can be obtained on application to Professor Pautrier at the Faculty of Medicine, Strasbourg. The fee for the course is Fr. 300. Should a sufficient number of applications be received a further practical course on the Bordet-Wassermann reaction will be arranged.

A Lecture
ON
THE SOLDIER'S HEART AND WAR NEUROSIS:
A STUDY IN SYMPTOMATOLOGY.

DELIVERED AT THE CLINICAL INSTITUTE, ST. ANDREWS,
BY
SIR JAMES MACKENZIE, M.D., F.R.S., F.R.C.P.

(Concluded from page 494.)

IX. THE MECHANISM OF VISCERAL PAIN (THE VISCERO-SENSORY REFLEX).

THE remarkable difference between the sensitiveness of the external body wall and the viscera in response to mechanical stimulation brings out clearly the difference in function of the two divisions of the nervous system—a difference which it is necessary clearly to understand if the symptoms of disease are to be fully comprehended. It shows that when pain is evoked from the organs or tissues which are not supplied by the sensory nerves of the cerebro-spinal system some other mechanism must take part in its production.

The nature of this mechanism is revealed by the study of the symptoms produced in certain forms of visceral disease. If we take the symptoms that are present in certain simple diseases—for example, a gastric ulcer, appendicitis, or renal colic—the mechanism by which a number of symptoms are produced will become clear. In many cases of gastric ulcer there is pain, limited to a small area, in the epigastric region. This pain has a different location from the ulcer. Thus the pain may be situated in the middle line, as in Fig. 6, where the shaded area, A, indicates the site of pain, while the ulcer, revealed at the *post-mortem* examination, is situated at the pylorus, which was found at x in Fig. 6. Moreover, if a patient with this pain breathes deeply, the stomach, with the ulcer, shifts its position, but the site of pain remains fixed. With these facts before us, the mechanism of pain in visceral disease becomes clear. When the disordered sensations of toothache were considered it was seen that the only reasonable explanation was that from the offending tooth a stimulus had been sent into the central nervous system. The effects of this stimulus were not limited to the cells of the nerve supplying the tooth, but spread to the cells of sensory nerves in the immediate neighbourhood, with the result that there was pain and hyperalgesia in neighbouring teeth and in the skin of the cheek.

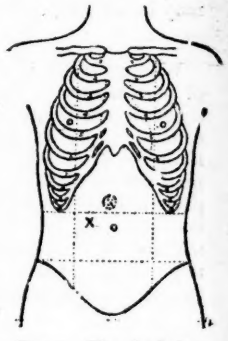

FIG. 6.—The shaded area in the centre shows the position of pain and hyperalgesia in a case of ulcer of the pylorus situated at x.

From the stomach a stimulus is conveyed by the sympathetic nerves into the central nervous system. But as these nerves are not "sensory" nerves in the sense that they are directly connected with any perceptor in the brain, no sensation is felt (Fig. 7). In like manner, so long as the impulses conveyed from the ulcer do not spread no pain is felt. When, however, the stimulus is of such a nature that it spreads to other cells, then we get a reaction peculiar to the cells stimulated. In this case the stimulus reaching the nearest sensory cells of the cerebro-spinal system irritates them, and the pain which results is referred to the peripheral distribution of the nerve stimulated—that is, the nerves supplying the area of skin as already described in paragraph V on referred pain. Fig. 8 illustrates the mechanism by which pain is produced in visceral disease, showing how an organ itself insensitive and supplied only by sympathetic nerves can produce pain by reacting upon the cells of the cerebro-spinal sensory system. The stimulus arising in the organ x passes to the central nervous system, where its cell, x', has no direct connexion with the sensorium, s, but when an adequate

stimulus arises it affects the neighbouring cell, B', which, being a pain nerve, gives rise to the sensation of pain which is localized at its peripheral distribution, B.

FIG. 7.

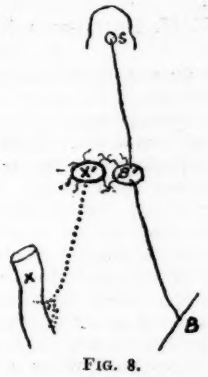

FIG. 8.

FIG. 7.—The normal movements of a viscus, X, pass into the central nervous system, X', but produce no sensation.

FIG. 8.—Shows the mechanism of a viscero-sensory reflex. A stimulus arising in a diseased organ, X (as in gastric ulcer), passes into the central nervous system, X', and if the stimulus be of a particular quality or strength it will affect a neighbouring sensory cell, B', which is recognized as pain and referred to the peripheral distribution of the nerve at B.

X. THE MECHANISM OF THE VISCERO-MOTOR REFLEX.

Before dealing with other phenomena produced by visceral disease it is necessary to consider the mechanism of the reflex which produces contraction of voluntary muscles as a result of a stimulation from the viscera. When we carefully palpate the abdominal wall in patients with disease of some abdominal organ, we will frequently find certain portions of the body wall hard and resistant. This manifestly is due to a contraction of a portion of one or more of the broad muscles which form the abdominal wall. It is a reflex contraction produced by a stimulus arising in the diseased viscus and sometimes referred to as "protective rigidity" of the muscles, as its purpose is obviously to protect the diseased organ. Every doctor is aware of this hardness in the epigastrium in gastric ulcer, due to rigidity of the upper portion of the recti muscles. The manner in which it is produced is similar to that operating in the case of the cutaneous reflex contraction, and may be diagrammatically represented as in Fig. 9, where the stimulus from the viscus X, passing to the cell X' in the central nervous system, excites the motor cell C', which produces a contraction of the muscle C.

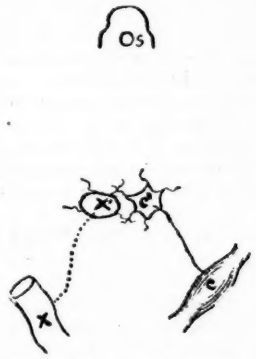

FIG. 9.—Shows the mechanism of the viscero-motor reflex. A stimulus arising in a diseased organ, X, passes into the central nervous system, X', and affects a neighbouring cell, C', which causes a contraction of skeletal muscles, C'.

There are different forms of reflex muscular contraction. The cutaneous reflex contraction is accompanied by a sensation; viscero-motor contraction is not necessarily accompanied by a sensation. The cutaneous reflex results is a momentary contraction of the muscle. The contraction of the muscle which arises from the visceral stimulation is persistent. In this persistent contraction of the muscle we get an insight into several processes of a very instructive kind. Light is thrown on some functions of the sympathetic system at present obscure, and some characteristic features of muscular contraction which have been overlooked are revealed.

From the study of this contraction it can be demonstrated that the tone maintained by the flat muscles of the abdomen is partly dependent on the stimuli reaching the motor cells of the muscles from the viscera. If we carefully watch certain cases of visceral disease, such as gastric ulcer, we will often find a varying degree of muscular rigidity. It may be scarcely possible to distinguish this increased resistance from that of the normal tone and resistance to palpation in unaffected muscles. This resistance often increases until the muscle is felt hard and board-like, and after a time it may subside and disappear. When the increased resistance is scarcely perceptible, it can be increased by rubbing gently along the muscle. Sometimes in walking the contraction of the muscle may be increased so that the patient walks with a stoop. The varying degrees of contraction are in all likelihood associated with varying degrees of activity of the disease, and I have at times found them of value in the management of such diseases as gastric ulcer. But the point I wish to make here is that this increase in contraction is evidently but an exaggeration of that condition called tone which is normally present in health.

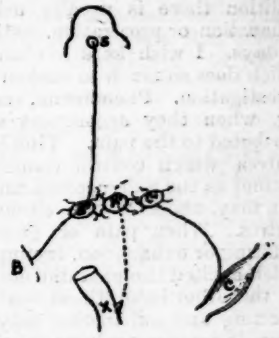

FIG. 10.—Shows the mechanism of a combined viscero-sensory and viscero-motor reflex. (See Figs. 8 and 9.)

Frequently these muscle contractions are associated with hyperalgesia of the skin overlying them, and the muscles themselves may be hyperalgesic. When this cutaneous hyperalgesia is present the cutaneous reflexes show some interesting variations. If the muscle is not contracted, or only slightly contracted, the reflexes may be much more lively in response to stimulation of the hyperalgesic skin. If the muscles are hard and board-like, the reflexes may seem to be abolished; little or no movement is obtained from stimulating the hyperalgesic skin, for the reason that the muscles are already contracted to their full extent.

It occasionally happens that we find the muscle distinctly contracted, with no cutaneous nor muscular hyperalgesia, as shown in Fig. 8. At other times we may find hyperalgesia of the skin only. Most frequently there is both cutaneous and muscular hyperalgesia along with a contracted muscle, as shown in Fig. 10, where the stimuli from X affect B' and C', producing in the one case pain referred to B and in the other contraction of the muscle C.

XI. MULTIPLE REFLEXES FROM VISCERAL STIMULATION.

So far, in speaking of reflexes I have referred to some as occurring singly. As a matter of fact, no stimulus produces only one reflex; there are always others. Some of these are so slight as not to be recognizable; others, quite a number of them, can be recognized.

If, for instance, we consider the symptoms provoked by the peristalsis of a hollow muscular organ the origin of a number of phenomena will be revealed. The presence of a small calculus in the pelvis of the kidney may set up a strong peristalsis of the ureter, giving rise to an attack of renal colic. With the onset of the attack uneasiness or pain is first felt, and the muscles of the abdomen become hard. In one patient the testicle was pulled up by the contraction of the cremaster muscle. The pain passes from the loins downwards into the testicle. It comes on in wave-like periods of intensity. Other symptoms arise—for example, vomiting, great prostration, with feeble action of the heart—so that partial loss of consciousness may follow. There is also pallor and profuse sweating. All these phenomena are produced by a stimulus reaching the central nervous

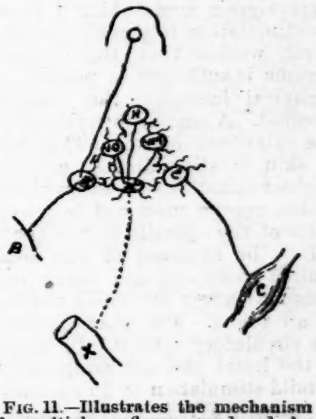

FIG. 11.—Illustrates the mechanism of multiple reflexes produced by visceral stimulation. An adequate stimulus arising in an organ, X, passes to X' in the central nervous system and affects a series of neighbouring cells, thus giving rise to pain (by stimulating B'), muscle contraction (by stimulating C'), vomiting (by stimulating the centre for vomiting, VO), cardiac depression (by stimulating the vagus, H'), pallor and sweating (by stimulating the vasomotor centres, VM).

system and there reacting on a number of special centres, such as the vomiting centres, the centre for regulating the vasomotor nerves, the centre of the vagus (Fig. 11).

When the attack passes off there is left a variety of phenomena, such as an area of cutaneous hyperalgesia with contraction of certain of the muscles of the abdomen. In addition there is usually ushered in a period of great exhaustion or prostration, lasting, it may be, for a number of days. I wish here to clear away one of those beliefs which does so much to darken understanding and hamper investigation. Phenomena, such as exhaustion and vomiting, when they accompany such an attack, are usually attributed to the pain. This is a pure assumption, for the centres which control vomiting and exhaustion are as distinct as the pain centres, and a stimulus which excites pain may, under certain circumstances, also excite those centres. When pain of great severity occurs without vomiting or exhaustion, it simply means that the stimulus which excited the pain did not affect those other centres. On the other hand, those centres may be stimulated, and vomiting and exhaustion may be produced without pain. Thus, it frequently happens that a sudden movement of the bowels resulting in the evacuation of a large loose motion is accompanied by vomiting and fainting without pain.

XII. Diminished Resistance to Stimulation (Focal).

I wish now to direct your attention to a feature of the nervous system which has not received from clinical observers the attention it merits—namely, the lowered resistance to stimulation which is produced by disease and other agencies.

In describing the phenomena of toothache, the well known facts of tenderness of the neighbouring healthy teeth and of the hyperalgesia of the skin of the cheek were commented on. A similar state of affairs is met with in connexion with visceral disease, for we often find in this condition that pressure over certain regions of the abdomen of a degree which in other parts of the body produces only the sensation of touch or pressure, gives rise to pain. In lightly pinching the skin, too, pain is caused over particular areas whereas no pain is felt in other areas. Frequently the skin itself is not hyperalgesic, but the deeper structures of the abdominal wall, especially the muscles, are painful on pressure.

In normal circumstances a stimulus has opposed to it a degree of resistance in producing pain. Its entrance into the pain centres is hindered, so that it must be of a certain strength or quality before it can pass. In these hyperalgesic areas which I have described the resistance to stimulation is greatly diminished, so that a stimulus much weaker than that which produces pain in other regions is sufficient to produce pain in these regions; in technical language, the "threshold of stimulation" is lowered. A similar lowering of the threshold is shown by the cutaneous reflexes. Thus when a hyperaesthetic area of skin is stimulated so as to produce a contraction, a slighter stimulus suffices for the work, and the contraction of the muscle produced is greater than in corresponding parts of the opposite side of the abdomen.

But the evidence of the diminished resistance is not limited to sensory and motor regions in the spinal cord. This may affect the whole nervous regulating mechanism of an organ. The phenomenon is best demonstrated in the circulatory system. In certain cases the movements of the heart and the vasomotor mechanism may respond to mild stimulation in an excessive manner—for example, an excessive rate of the heart on mild exertion or an excessive contraction of the blood vessels from some slight stimulus as, for instance, mental effort or exposure to cold. Thus, in a patient with aortic regurgitation, I have seen the blood pressure rise when the patient was engaged in a quiet conversation, and I have seen this rise followed by a violent attack of pain. Indeed, in certain sufferers from heart disease the nervous mechanism of the organ may become so sensitive to stimulation that this may provoke attacks of palpitation or of pain. This stimulation may consist of factors which do not directly affect the heart—for example, mental excitement, the excitation of the skin of the left chest by pressure of a stethoscope, or a mere movement of the left arm of the patient. Numerous instances of the lowering of the threshold of stimulation will occur. People in whom the fingers become cold, pale, and numb, on exposure to a very moderate degree of cold, have an excessive sensibility of certain vasomotor centres. Some people, again, when worried or fatigued suffer from persistent vomiting.

XIII. Diminished Resistance to Stimulation (General).

The purpose of these illustrations is to call attention to a factor which has only been dimly perceived, but which is a very important element in the production of a large class of symptoms. This factor is diminished resistance to stimulation. So far instances of it have been confined to diseases of a simple kind—for example, toothache, gastric ulcer, disturbances of the heart and vasomotor system, and of the vomiting centre. It will now be profitable to inquire whether there are not conditions in which the diminished resistance may be of a much greater extent, for if such conditions be found we may find at the same time a clear explanation of the manner in which many symptoms are produced.

We know that when a patient becomes the subject of a microbic infection there is speedily induced a loss of the sense of well-being and the appearance of sensations of discomfort or suffering. The daily routine becomes laborious and difficult; it is accompanied by loss of appetite, and fatigue is easily brought on. Indeed, so readily may exhaustion be produced that, even with a mild infection, collapse of an extreme kind may occur—as, for instance, in the case of a youth training for a race who fell and lost consciousness in running a short distance. Before starting he felt seedy, but thought he could throw the feeling off by the exercise. He was found to have a slight rise of temperature; in a few days he was well and resumed his training, which he completed without mishap. If patients with a mild infection be observed it will often be found that their heart's rate is increased, and that their response to effort is accompanied by an undue acceleration of the heart's rate, while breathlessness and fatigue are more readily induced than in health. These facts are well known to every observing doctor, and their interpretation seems to be that something has occurred which has lowered the resistance to stimulation. As a result the heart is more readily stimulated to rapid action, and a disturbance of the vasomotor mechanism takes place which leads to exhaustion or loss of consciousness.

If an individual, the victim of a mild infection, persists in leading the strenuous life he may have pursued when enjoying vigorous health, other manifestations develop. The heart's exhaustion may proceed apace till breathlessness is readily produced on moderate exertion. Pain, too, may be experienced, sometimes of such severity that it is diagnosed as angina pectoris, while the skin of the left side of the chest may become extremely hyperalgesic.

The following experiences show what I am trying to demonstrate. A woman fell into ill health of a vague kind, but developed attacks of pain in the left chest, evidently of cardiac origin, of such severity that several experienced physicians diagnosed the condition as one of angina pectoris of a very grave type. Little relief was obtained, and the case dragged on for months. When I saw her I felt confident that the attacks of pain, though cardiac in origin, were not due to organic disease of the heart, but that she was suffering from some toxic condition, and a search was made for some source of infection. The only suspicious circumstance was an obscure swelling in the pelvis, whose nature an expert gynaecologist could not determine. After a few weeks an abscess burst into the bladder, and after the discharge of pus the attacks of "angina" gradually disappeared, and she made a good recovery.

A man fell into poor health. He became depressed in spirits; his brain was readily exhausted after reading a short time; he was short of breath on exertion, and easily tired. He flushed readily, and his heart beat rapidly on the slightest exertion. Nothing amiss could be detected on physical examination till, after some months, a certain degree of discomfort directed attention to his mouth, and he was found to have an abscess in his antrum. The evacuation of the pus was followed by a speedy recovery.

It is manifest, from a history of such cases, that the primary cause of trouble was an infection which poisoned certain structures of the body, in particular the nervous system and regulating mechanism of the heart and blood

vessels, and rendered those parts abnormally sensitive to stimulation, so that bodily or mental effort, which in health could be undertaken without distress, now induced the signs of exhaustion peculiar to each organ.

What is true of the circulatory system is true also of every other system. When we meet with symptoms of the disturbance of one organ a systematic inquiry will often lead to the detection of evidence of functional disturbance in other organs.

This matter can be illustrated by a consideration of experiences that have lately been familiar to most of you in the so-called "soldier's heart" and the neuroses of war.

XIV. The Soldier's Heart.

For many years before the war I had puzzled over the description of the condition called the "irritable heart of soldiers." Many years ago I had seen men in good health who had been invalided out of the army because of this affection, and I could find nothing the matter with their hearts. When the war broke out I seized the opportunity to find out the nature of this condition. At the suggestion of the Medical Research Committee a systematic investigation was undertaken by Dr. R. M. Wilson and myself, and we produced a preliminary report on the subject. The work was ultimately carried on at hospitals set apart for the purpose; but I continued my own investigations, and briefly the following are the conclusions to which I came: The condition which goes now under a variety of names—as the soldier's heart, the irritable heart of soldiers, disordered action of the heart, effort syndrome, and neuro-muscular asthenia—is not peculiar to soldiers, but is of frequent occurrence in civil life. The ill health or incapacity which is present is not limited or only due to the cardiac condition, for other organs are also affected, so that the cardiac manifestations form but a part of the picture of ill health. The main symptoms of which the soldiers complained were shortness of breath or exhaustion or palpitation easily produced on moderate effort. In some cases pain in the chest was felt, sometimes of great severity, coming on in response to effort or when at rest. An examination revealed in some an increased rate of the heart, and in many an excessive increase in response to effort. Occasionally there was a slight enlargement of the heart.

In the limitation of the response to effort (shown by breathlessness easily produced) and in the increased rate of the heart we get evidences of increased susceptibility to stimulation on the part of the organ.

A heart in this condition of undue excitability, compelled to do the same amount of work as it did when the health was good, will become sooner or later exhausted, and so we will find a series of symptoms arise which are the outcome of exhaustion.

While the over-excitability of the heart is brought about mainly by a disturbance affecting its nervous mechanism, in all probability the same injurious influence affects the myocardium itself, so that the efficiency of the heart may be impaired.

XV. War Neuroses.

The foregoing are, in brief, the chief manifestations of the irritable heart of soldiers. But if the patient be more carefully scrutinized other symptoms will be found. His face is often lined and drawn; he is often nervous in manner, and occasionally he shows fine tremors in his hands and fingers. Inquiry reveals a varying degree of mental disturbance, apathy, disinclination for exertion, mental depression, and irritability of temper. The memory is not retentive, and on mental effort—for example, reading—fatigue is readily induced. In many cases other phenomena are detected, but these are sufficient to show that in nearly all these cases there is a mental side to the ill health as well as a cardiac.

If one were to concentrate the attention on the nervous phenomena in a great many of these cases, the conclusion arrived at would be that the patient suffered from a neurosis. Indeed, this is what is constantly happening, for certain doctors would unhesitatingly class some soldier patients as suffering from neurasthenia, or some other form of war neurosis, while others would class the same patients as suffering from the irritable heart of soldiers.

If the inquiry be carried further definite symptoms of derangement of other organs can be obtained. Thus a rapid respiratory rate, not due to any lung or heart affection, may probably, as Haldane pointed out, be due to an excessive irritability of the respiratory reflex. Digestive disturbances are present in the great majority. Did we possess the knowledge we might almost certainly discover signs pointing to the deranged function of every organ of the body. Indeed, some physicians have detected signs of hyperthyroidism in so many of these cases that they attribute most of the circulatory disturbances to this condition.

XVI. The Mechanism of Symptoms.

The inference drawn from such experiences was that a condition of diminished resistance to stimulation had been induced, and the attempt to lead the life and do the work of healthy vigorous men had proved unavailing. Health had given way from exhaustion. The manifestations of this exhaustion were exhibited by the different organs that had been submitted to the strain; in one case the heart and circulatory system were most affected, in another the nervous system. Thus we get the variety of phenomena which these soldiers exhibit.

This way of looking at the matter illustrates a method of investigation that has not been so fully appreciated or utilized in medical research as it deserves. It shows the importance of applying the "law of associated phenomena" in all medical examinations. This law is based upon the fact that in ill health there are a great variety of phenomena. It has been the habit to a large extent to give consideration to the more prominent signs and to label the disease by the names of such dominant signs. We constantly met soldiers invalided and pensioned on account of so-called aortic or mitral disease, because a systolic murmur had been detected, yet in the vast majority of these cases there was absolutely nothing the matter with the aortic or mitral valves. If the principles underlying the classification of symptoms and the law of associated phenomena had been understood such mistakes would not have arisen.

Physicians who have been engaged in war work are now publishing their experiences, and you will find in the medical journals that the old method of docketing the soldiers' complaints according to the organ supposed to be affected is pursued. Thus we have sick men described as cases of irritable heart, of neurasthenia, and of hysteria; that is to say, the complaints are attributed to the organ whose symptoms are most prominent to the observer.

XVII. Practical Importance of Recognizing the Mechanism of Symptoms.

It may seem to you that this aspect of the matter is already recognized, and that the presentation of it in this way is unnecessary. But it frequently happens that what is supposed to be well known and commonplace is in reality so imperfectly known that its true significance has been entirely missed. In the cases to which I am referring it will be seen that the procedure usually employed in medicine, of describing diseases as limited to one organ or system, is misleading.

Recognition of this general lowering of resistance to stimulation enables one to perceive that the manifestations of the different organs are but an expression of the irritability of their nervous mechanism, and compels an inquiry into the condition which has induced it. In many cases such an inquiry will result in the discovery of some focal disease or in the detection of some infection—for example, malaria or dysentery, or tubercle.

Another important result of this recognition is that we are no longer so likely to be misled in the estimation of the significance of some abnormal sign. A large number of these cases of nervous heart are labelled "valvular disease of the heart" because there is a systolic murmur present, and the limited response to effort, breathlessness on exertion, or increased rate of the heart, is taken to be evidence of an organ impaired by mitral or aortic disease. I know that large numbers of cases have been invalided out of the army and granted pensions because of misapprehension of the significance of murmurs, particularly when these murmurs were associated with the phenomena I have described. The same thing applies to affections of the nervous system. We often find this type of case called "neurasthenia" or some other form of neurosis, and subjected to various methods of treatment based upon an erroneous conception of its nature.

Furthermore, the necessity of recognizing the nature of the phenomena which lowers resistance is seen in the tests which are recommended by the military authorities for determining the fitness of a man. To ascertain the functional efficiency of the heart certain exercises are enjoined. If, in response to these, there is an increase in the rate of the heart or of the breathing, it is assumed that the organ is impaired. The evil symptoms are taken as indications of such impairment. If the principles I have been enunciating be grasped, it will be seen that it is not the heart condition that is being tested by these exercises but the susceptibility of the heart to stimulation. In some cases the increased rate may represent cardiac inefficiency, but in the vast majority of cases it represents nothing of the sort, for the cardiac irritability is but one of many phenomena the detection of which would afford a clue to the real nature of the trouble.

XVIII. Illustration of Harm done by Ignoring the Mechanism of Symptoms.

I have had plenty of experience showing the widespread harm of this limited study of patients' symptoms. I have been frequently consulted by men who have been rejected for the army and pensioned because of a misconception of their symptoms. I saw recently a man who was invalided out of the army and told he had got aortic disease, and that his heart was so damaged that he would never be able to undertake any occupation requiring physical effort. He was given a full pension. When I saw him he was leading a miserable existence, creeping about a few hours a day. He was easily tired, and he attributed his exhaustion to his heart complaint. His heart was easily stimulated to rapid action, and there was present a systolic murmur at the base. When I tried to assure him that there was no aortic disease and that his heart was perfectly sound, I found it was impossible to convince him. When in the army these sensations of exhaustion came on and the army doctors had detected the murmur and called it aortic disease and had treated him for a time in bed and then invalided him out. The pensions doctors had repeatedly confirmed this view of his condition, and had backed up their opinion by giving the largest pension allowance. Is there little wonder that this man cannot be convinced as to the true nature of his condition? He is made a miserable wreck on account of a defect in medical knowledge—namely, ignorance of the nature and significance of symptoms.

XIX. The Origin of Ill Health.

In a careful inquiry into the origin of ill health in over 2,000 soldiers I found that in the case of about 80 per cent. the first onset of their illness began with some complaint of an infectious nature, such as measles, influenza, trench fever, typhoid fever, malaria, dysentery, or "P.U.O." In other cases one could gather that the onset was due to an ill-defined illness suspiciously like an infection.

In a number of cases there was no history of infection, and the onset of the illness seemed to be due to a variety of circumstances. Some of the men were weakly before they entered the army, and the unaccustomed strain had seemingly been the cause. Others, originally quite healthy, had been exposed to a long and continued bodily and mental strain; want of rest had evidently been the provoking agent in these instances.

The history of the origin of these complaints and the manifestation of ill health accorded with the experience of civil practice. We repeatedly meet with patients who, on recovery from a febrile illness, suffer in the same way for varying periods.

Conclusion.

I have given in this lecture a bare outline of one phase of symptomatology, merely to indicate the mechanism by which certain symptoms are produced, and the far-reaching inferences that can safely be drawn from the consideration of this phase. It will be seen that a large amount of work is necessary to complete the picture and to understand the nature of symptoms. The study also affords a guide to further research. For instance, a great number of diseases are only recognizable by the presence of their reflex symptoms—diseases like gastric ulcer and appendicitis. We want to know the nature of the stimulus capable of producing these symptoms, whether it is an an exaggeration of a normal stimulus or a product of disease. It can also be seen how important it is, in examining the sick, to be guided by the law of associated phenomena, while a definite object to be achieved—that of finding the agent which produces the diminished resistance—is held clearly before the investigator.

PUBLIC HEALTH ADMINISTRATION IN EPIDEMICS OF MEASLES.

BY

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DIRECTOR OF STATISTICS, MEDICAL RESEARCH COMMITTEE.

During the twenty years I was engaged in active work in the Public Health Service the question of the best methods of administration in epidemics of measles came under my subconscious mind at more or less regular intervals. As I was not responsible for the field work, but only for the treatment of those suffering from the disease, there was no need for immediate decision, so that it was not until the end of my hospital experience that I seriously began to consider the subject in its different aspects. In actual practice nothing was being done to limit the spread of measles save to apply those general principles which seemed to offer a reasonable chance of success in combating the spread of all infectious diseases. These principles included notification, isolation of the infected person, and disinfection of the infected articles as a part of the process. They extended, however, much more widely, and included the destruction of unhealthy property, the prevention of overcrowding, and the improvement of general sanitation. It is one of the ironies of health administration that such obvious reforms were neglected year after year until an outbreak of typhus or small-pox brought the necessary stimulus to the lay mind to allow the medical officer to initiate these measures to control infectious diseases. The powers granted to limit infectious disease acted, however, much more to the advantage of the community in improving the standard of health than in the repression of infectious disease.

The present generation now possesses the kind of knowledge which enables it to recognize that the adequate administration of any infectious disease depends only to a small extent upon general principles and chiefly upon an exact knowledge of the natural history of the disease. Thus while the amount of typhus fever was undoubtedly limited through the application of general hygienic measures, these were definitely successful because the measures brought those possibly infected by the disease under such supervision as to ensure that both their houses and clothing were properly cleansed, and thus the louse, the active agent in the transmission of the disease, was eliminated. So also at the present day the control of malaria is found to depend upon measures which, though perhaps indirectly advantageous to the general health, are yet much more potently disadvantageous to the agent by which the disease is spread—namely, the mosquito. A well-known example of a disease which isolation, disinfection and sanitation have proved quite powerless to control is scarlet fever.

The control of measles is a problem, therefore, to be considered solely with reference to the natural history of the disease. The disease is most infectious—in fact it is of the eruptive fevers the most infectious, except small-pox. In contrast to small-pox, no protection such as that afforded by vaccination has hitherto been found. The infection, again in contrast to small-pox, is present in a very intense degree at the first onset of the catarrhal symptoms, and as these precede the appearance of the rash by at least three days, this period passes in most cases before the cause of the symptoms present has been recognized. Through the coughing due to the catarrh the infection is spread through the air. As far as can be statistically estimated at present, all but a fraction of those persons who come within the range of infection succumb at the most to two exposures to infection of the kind experienced in natural conditions.

Only one means of protection exists for any but those gifted with special immunity, and that is a previous attack. Though this is, of course, well known, it may not be inappropriate to state that it was brought very

forcibly under my notice when I visited some years ago a Highland glen from which measles had been absent for more than eighty years. An epidemic had just ended; it swept the glen from the western end to the eastern, hardly anyone—man, woman, or child—escaping the infection. Among the inhabitants whom I met was an old farmer of nearly eighty years of age who had just recovered from the disease. He discussed the matter with a curious mixture of pride and shame—pride that such an unusual experience had been his lot, shame that at his great age he had succumbed to such an infantile malady. It may be noted, by the way, in contradiction of the erroneous and quite common belief, that though the soil was practically virgin in this epidemic, not a single death occurred.

Now a disease which possesses such a degree of infectivity is quite clearly not open to administrative control in the sense that control means prevention. In saying this I do not doubt that the infection of measles might be successfully excluded from a definite area for a limited period of years if proper measures, necessarily very expensive, were adopted. The sole effect of this exclusion would be, however, to permit the development of a population open to the infection—a population which would be devastated the moment the infection were reintroduced; while, if the disease were thus reintroduced, the expense of its extermination would again have to be faced. I do not suppose—nor do I think that anyone else supposes—that there is any hope of success on the lines of prevention of infection in this manner, but that does not imply that some degree of success may not be possible on other lines.

The question of the administration of measles epidemics will now be discussed under two heads:

I. The administrative. With regard to this, there are two points of importance:
   - IA. The source of infection at each age.
   - IB. The variation of the death rate due to measles with age.

II. The medical. Under this heading come the points of:
   - IIA. Early diagnosis.
   - IIB. Hospital treatment.

IA. *Source of Infection.*

It is a general experience among middle-class parents that their children rarely take measles until the school age of the eldest begins. This is not so markedly the case with the working classes. Among these greater facilities of infection are afforded by the children playing together in the street, for such a disease as measles is practically only spread by direct contact. In spite of this, however, in the opinion of a number of medical officers the fire is lighted in the schools, and it is only then that streets and stairheads become of importance as a means of spread. That this holds true can be shown in another way.

In the table the statistics relating to Aberdeen show the rate of infection of the population by measles for each age period up to fifteen years of age. The general facts are as follows: Under the age of six months the disease is not readily taken. From the age of six months to the age of between six and seven years there is an almost uniform rate of attack. After this age the rate at which the population is attacked falls approximately in a geometrical progression. It is probable, as the result of certain calculations, that the greatest susceptibility exists between the ages of three and four years, but this point cannot certainly be determined. Now it is impossible to reason from the form of this distribution as to its probable cause, but it is possible to assume a cause and then construct an age distribution. If it be then assumed that in families of young children the children do not as a rule take measles until the eldest child has become sufficiently old to go to school, as has been suggested previously, and if it be assumed that epidemics occur more or less regularly, the age distribution of attack can be easily calculated. The result of the calculation is to give a distribution essentially identical with that found. It may thus be presumed that in the majority of cases children under five years of age are infected by the elder children who acquire the infection in school. If this be the case some hope of administrative improvement may be entertained.

Table showing the Rate of Attack from Measles per 1,000 Persons Living for Aberdeen and the Case Mortality in Aberdeen and in Glasgow.

	Aberdeen City, 1883–1902.				Glasgow Hospital Cases, 1885–1902.		
	Rate of Attack per 1,000 per ann.	Cases.	Deaths.	Case Mortality per 100.	Cases.	Deaths.	Case Mortality per 100.
Months							
0–3 ...	13.4	244	19	7.8	20	2	10.0
3–6 ...	38.6	665	64	9.6	97	9	9.3
6–9 ...	76.0	1,263	186	14.7	366	78	21.3
9–12 ...	53.2	862	157	18.2	387	79	20.4
Years							
1–2 ...	85.6	5,222	526	10.0	1,227	321	26.5
2–3 ...	85.6	5,195	178	3.4	1,545	240	15.5
3–4 ...	79.3	5,053	82	1.6	1,718	179	10.4
4–5 ...	75.4	4,336	43	0.9	1,600	80	5.0
5–6 ...	86.3	5,352	35	0.7	1,503	65	4.3
6–7 ...	75.2	4,628	21	0.5	1,235	33	2.7
7–8 ...	47.3	2,818	14	0.5	796	11	1.4
8–9 ...	21.0	1,258	5	0.4	398	6	1.5
9–10 ...	11.3	672	4	0.6	214	1	0.4
10–11 ...	6.7	406	1	0.2	110	4	3.6
11–12 ...	4.5	259	—	—	60	3	5.0
12–13 ...	4.1	241	—	—	47	—	—
13–14 ...	2.9	169	2	—	28	—	—
14–15 ...	2.6	150	—	—	23	2	8.7

IB. *Age Variation of Death Rate.*

Here certain facts must be specially discussed. These are shown in the table; in it the number of cases and deaths occurring in the cities of Glasgow and Aberdeen are compared. In the former city the cases admitted to hospital furnish the evidence; in the latter notification was in existence for twenty years, and the death rates for the whole city are available. The same kind of variation in the death rate holds in both places, though the cases in the Glasgow hospitals have very excessive death rates. These cases are drawn largely from the slums, though this is not the whole explanation of the difference, as from year to year when the death rates at ages under five years are calculated for the cities as a whole, those in Glasgow are considerably greater than those in Aberdeen.

Referring to the table, it is seen that the death rate between six months and two years is exceedingly high and from that age declines. In the cases in the Glasgow hospitals to which the statistics refer (18,000 cases in all) the death rates between the ages of one and two years and between the ages of five and six years were respectively 26.6 per cent. and 4.3 per cent.; the average death rate of all the admitted cases was 9.1 per cent. The corresponding figures for Aberdeen between 1883 and 1902, the years of notification, are 10.0 and 0.7 per cent. respectively. But it is not only in the increased death rate at early ages that the damage due to measles is seen. Lung and eye affections, two of the worst complications associated with measles, occur almost solely under the age of five years and are specially common in the first two or three years of life. Not less important is the influence which an attack of measles possesses in lighting up latent tuberculosis. This is also much more common between the ages of one and three.

It seems desirable, therefore, to consider whether it is not possible to limit the number of cases under the age of five years. Of course complete immunity at these ages cannot be secured, but I think that the absolute number of attacks of measles under five years of age should be very much smaller than it is. It is a matter of administration. It cannot be doubted that a very large proportion of those children who take measles under five years of age are infected by elder brothers or sisters who are attending

school. The question, then, which requires to be investigated is how far this can be prevented. I am quite certain that with the machinery in existence—namely, the medical inspection of schools and the sanitary control of the district—this should be a comparatively easy matter. It will want, of course, careful thinking out in every district. It will want special training of the epidemic inspectors and of the sanitary inspectors, as in the event of an epidemic the work would be so much increased that the latter would necessarily be temporarily seconded. Once the training has been accomplished, no further difficulty should be experienced.

Each school will keep a register. When a child of five years is admitted to a class at school it will be noted in the record whether that child is the eldest, intermediate, or youngest member of the family. When measles breaks out in a class the register will be consulted. If the child exposed to infection be the youngest member of the family, nature may be left to take her way—there is no further danger. But if he or she be the eldest, especially if the younger children in the house are of ages between six months and three years, the direct action of nature is no longer a matter of indifference. What is a mild disease at the age of five years may be a matter of grave danger at the age of six months.

Now it may be taken as practically certain that very few children develop the first symptoms of measles within seven days of the infection, and the higher limit may be set at fourteen days. If therefore the child which has been exposed to the infection stay in its home for seven days after exposure no harm will ensue. It is the next seven days which are important. In the entourage of families in towns, especially where the families are very young, the house of at least one grandmother is usually available. There are also quite frequently houses of uncles and aunts in which there are either no children or in which the children have already passed through the necessary attack of measles. It is thus only a matter of arrangement that the child who has been exposed to infection stays with a grandmother or other relative for a specified seven days. It may be objected that this cannot be done. On the contrary, I have made such arrangements for many years with reference to cases of scarlet fever and diphtheria. Where on dismissal there was some doubt as to whether a patient were free from infection or not, and where it was obvious that continued residence in the hospital was not the best way to clear the patient of infection, I at once appealed to the parents. I found that the arrangements made were loyally carried out in nearly every case; the average parents are not selfish as regards their children, but much the reverse. There are, of course, a number of unreasonable and untrustworthy people, but in my dealings I have found these the exception. Once the matter has been carefully explained the ordinary person wishes to act for the best. Of course at the institution of a new method of administration there will be a considerable amount of evasion, but from the moment that the opponents of the system see their children going to the grave while those who accede find their children do not take the disease, the sarcasm of the neighbours will effect more than thousands of regulations. A few years' trial will put all the community on your side, and then the work is done.

The possibility of using reception houses requires consideration. It is of course quite futile to provide reception houses on a large scale, since the gathering together of many children who have been exposed to infection is but to exaggerate the chance of all taking the disease. It might even happen that only one child was infected on admission, and he or she might infect the whole. It is, however, not out of the question with individual cases. In certain instances where there is a large family of young children, and where there is no chance of the possibly infected child staying with friends, such an arrangement might quite well be made, especially in large towns where reception houses are kept open perpetually in view of small-pox and typhus fever there would in many cases be no difficulty in taking suitable action.

II A. *Early Diagnosis.*

The most difficult point in the administration of measles is that which arises from the great amount of infective material given off from the very first symptoms of the disease. I have never seen any reason to believe that there was any power of infecting prior to the first symptoms, so that the problem is reduced to the accurate observation of these. What, then, are the first symptoms? For administrative purposes there are only two which are of the smallest particle of use, nor are these of any certain value. The usual advice to look for the Koplik spots is vanity. By the time these have appeared the damage is done.

The first and most important of these symptoms is a rise of temperature. It is astonishing how often, after nine or ten days from the exposure, the temperature rises for a single evening to 101°, 102°, or 103°. Next morning it is again normal, and remains so for twenty-four to forty-eight hours after this. A chart of this form of onset is given in Wunderlich's *Medical Thermometry*. This is specially observed when measles develops in a person whose body is protected from chill, such as when a child is in bed or in hospital. If there is the slightest suspicion of infection being present administrative measures should be taken immediately on the rise of temperature. This symptom is specially of use when children are under the observation of a skilled nurse and temperatures are taken regularly as a routine.

The second symptom is oedema of the conjunctiva. This is much the earliest symptom of the catarrh to appear. The oedema is confined to the palpebral conjunctiva, and especially that of the lower lid. I have seen it stated that the first appearance of the oedema is on the ocular conjunctiva. This, however, is totally at variance with my experience. Even when the catarrh of the eye is very marked on the third and fourth days of the disease, the ocular conjunctiva is generally almost clear, the congestion and oedema being confined chiefly to the palpebral conjunctiva. When this oedema of the palpebral conjunctiva associated with a rise of temperature in a child who has been exposed to measles infection is observed the diagnosis is practically certain. If the child be removed at once there is some chance, especially if the type of epidemic be not specially infective, that those in the environment will escape. With care these symptoms might be used successfully under skilled observation in a reception house, if there was no close contact between the different children. Measles is a disease I have never found to spread from room to room if there was no direct air connexion between them, nor have I ever seen it carried by nurses from one house to another. It must be confessed, however, that even with the greatest care the effort to prevent spread of infection fails in the majority of cases. An improved technique will be required before success is possible.

II B. *Hospital Treatment.*

If young children have been exposed to measles what procedure is necessary? I think it essential that they be put to bed before the first symptoms appear—that is, eight days after exposure to infection—and kept there for a few days until it is certain whether the infection has been acquired or not. There is all the difference in the world between an attack of measles developing in a child exposed to body chill owing to draughts, etc., and a child developing the disease under conditions of warmth and rest. Even if this stage be missed, with the first symptoms of catarrh bed is the place.

In the next place, if the disease promises to be of great severity, I am quite certain that hospital treatment is the best. When, on the fourth or fifth day of illness, the rash begins to appear in the bronchi, great respiratory distress and cyanosis are frequent. This condition I call "suffocative catarrh" to distinguish it from bronchopneumonia. It is one of the curses of cellular pathology to group all sorts of different diseases under one name. This suffocative catarrh is a part of the disease—measles—and has no relation to true bronchopneumonia, which is quite a different disease. The catarrh kills in a few days, the bulk of the deaths occurring within eight days of the first symptoms of measles. Bronchopneumonia runs a longer course, the bulk of the deaths occurring twelve days after the onset of the disease. It is a secondary infection to measles, while the catarrh is a part of the primary disease.

This catarrh, if severe, is a condition of extreme gravity, which demands careful nursing and also environmental conditions not easily obtained in a private house. I have

not a particle of doubt that these children are very much better treated in the open air. Furthermore, the administration of oxygen in many cases makes all the difference between recovery and death. In addition, though the remark is not strictly appropriate in this connexion, these children, in my experience, are the better of a certain amount of alcohol if they are not too cyanosed to oxidize it. In making these statements I am fully aware that I am speaking somewhat rashly, because, regarding children suffering from severe suffocative catarrh in measles I have never learnt to make anything which can be called an accurate prognosis, and consequently have difficulty in stating the results of treatment statistically. Thus, in teaching I have demonstrated two cases to my students—one as likely to recover, and the other as likely to die—only to have to point out the next day that the child I thought was probably going to recover was now dead, and that the other, if not out of danger, was at least considerably better than on the previous day. This rapid improvement is the rule in cases of suffocative catarrh if cure is to take place. A child may be within the immediate zone of death and within a couple of days be comparatively well. If bronchopneumonia is implanted on the catarrh, the change to convalescence is a matter of ten days to three weeks. The two conditions should not be confounded.

A further point of importance with regard to the treatment of severe cases of measles, and a treatment only easily obtained in hospitals, is the care of the eye. An attack of measles is quite frequently the starting-point of eye trouble. For the proper cleansing of the eye regular washing out is necessary, and the technique requires adequate training on the part of the attendants. Sometimes even hourly cleansing is required, and that cannot be provided at home except in the houses of the rich.

THE PHYSIOLOGICAL COST OF MUSCULAR WORK.

BEING THE SUBSTANCE OF A LECTURE TO THE CHELSEA POLYTECHNIC, FEBRUARY 23RD, 1920.

BY

A. D. WALLER, M.D., F.R.S.

THIS "lecture" is essentially intended as a demonstration of method and apparatus by means of which a fundamental problem—to the answer of which an important part might be contributed by a polytechnic school—can be approached and compassed.

Shortly stated, the general problem requires numerical answer to the question—What, or rather *how much*, is the physiological cost of various forms of mechanical work as done by a dock labourer and a printer, a carpenter and a tailor?

This cost is most readily measured by measuring the CO_2 expired in consequence of the internal combustion that takes place in all living matter—in lowest degree during deepest sleep, in highest degree during heaviest muscular work. And the particular part of the problem on which, at the suggestion of the Principal, I shall invite your answer will be as follows: What is the energy output, expressed in calories per head per hour, (*a*) for a class sitting listening to a lecture; (*b*) for a class carrying out physical exercise drill?

I should like to make it possible as an outcome of this lecture (1) that every student here should be able to give a reasonably good theoretical answer on paper, and (2) that one, or preferably two, of your number should be able of their own knowledge to get out by means of the apparatus now before you a more or less accurate statement of actual fact in, say, a month's time.

The apparatus consists of three parts:

1. The *collecting bag*, with valved mouthpiece and tap, to receive the expired air of the subject for, say, a minute or half a minute.

2. The *analyser*, to measure directly the percentage of CO_2 present in that expired air.

3. The *spirometer*, to measure its volume in litres.

And here are the results of a typical observation like that which has just been made under your eyes:

	Ventilation.		CO_2.		Calories.*
	Per Minute.	Per Second.	Per Cent.	Per Second.	Per Hour.
At rest...	6 litres	100 c.cm.	3	3 c.cm.	60
At work (walking at 3½ miles an hour)	24 ,,	400 ,,	4	16 ,,	320

* The translation into calories per hour assumes that 1 c.cm CO_2 per second = 20 calories per hour. For this equivalence the calorific value per 1 c.cm. CO_2 has been taken = 5·55 calories.

It is obvious to you from this observation that the work of walking has caused a measurable increase of CO_2 output, and you have learned further that the physiological cost of walking at 3½ miles an hour is 320 calories gross, or 260 calories net per hour.

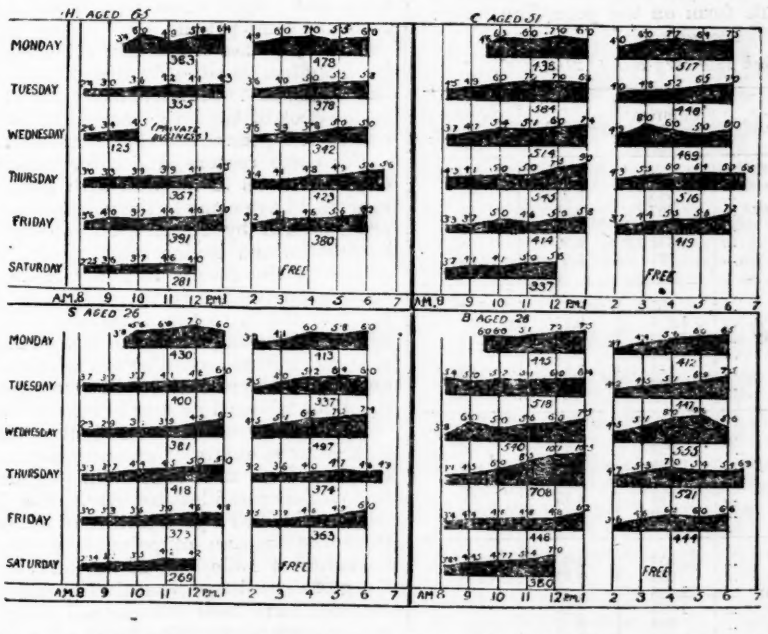
The small value (60 calories per hour) represents the cost of bare life without work—that is, the basal cost; it goes on, of course, during work, and has therefore to be subtracted from the gross cost of work, leaving us with its net cost. (Obviously if we know the mechanical value of the work we can calculate out a value for the ratio

$$\frac{\text{work}}{\text{net cost of work}}$$

which is a measure of physiological efficiency; but with this measure we are not concerned to-day.)

I will now put before you a brief report of a week's observation just concluded by Miss G. De Decker at the printing rooms of the BRITISH MEDICAL JOURNAL, with the helpful co-operation of four compositors—H., C., S., and B.

The procedure was to collect every hour from each man during the six days of work the expired air for a period of one minute. Each bagful was then dealt with as you have just seen done—that is, its volume measured by spirometer and its CO_2 percentage taken by analyser, so that the rate per second of CO_2 discharge was ascertained and plotted on squared paper. The hourly CO_2 ordinate of each man was thus recorded for each day, and the value in calories of the day's energy output was computed as a simple summation of the ordinates, as for



the day given below *in extenso*. (This was the first day, and our observation started at 9.30 a.m., whereas work actually began at 8 a.m., as shown in the week's summary.)

H., aged 65; Weight, 10 st.; Height, 5 ft. 8 in.; Surface, 1.71 M. February 16th, 1920.

Time.	Ventilation.		CO_2.		Calories.
	Per Minute.	Per Second.	Per Cent.	Per Second.	
9.30	8.5 litres	142 c.cm.	2.4	3.4 c.cm.	383
10...	12.0 ,,	200 ,,	3.0	6.0 ,,	
11...	9.0 ,,	150 ,,	3.2	4.8 ,,	
12...	11.5 ,,	192 ,,	3.0	5.8 ,,	
1...	12.0 ,,	200 ,,	3.2	6.4 ,,	
Dinner hour ...	—	—	—	—	
2...	9.0 ,,	150 ,,	3.2	4.8 ,,	478
3...	12.0 ,,	200 ,,	3.0	6.0 ,,	
4...	12.0 ,,	200 ,,	3.5	7.0 ,,	
5...	11.0 ,,	183 ,,	3.0	5.5 ,,	
6...	12.0 ,,	200 ,,	3.0	6.0 ,,	861

The working out of this day's calories is as follows:

Morning: 47+ 60+ 96+116+64=383
Afternoon: 48+120+140+110+60=478

861

Total: 861 calories in 7½ hours, or 115 calories per hour.

The summary account of the results of six days of observation on four workers, recorded and calculated as above, is given in graphic form on the preceding page:

Summary for the Week February 16th to 21st, 1920.

Subject.	Day.	Calories per Day.	Hours.	Calories per Hour.
No. 1, H.	Monday ...	861	7.5	115
Age 65.	Tuesday ...	733	8.75	84
Weight 63.5.	Wednesday ...	467	5.75	81
Height 1 73.	Thursday ...	790	9.25	85
Surface 1.71.	Friday ...	771	8.75	88
	Saturday ...	281	3.5	80
No. 2, C.	Monday ...	955	7.5	127
Age 51.	Tuesday ...	1,024	8.75	117
Weight 62.6.	Wednesday ...	1,003	8.75	115
Height 1.70.	Thursday ...	1,061	9.25	115
Surface 1.68.	Friday ...	833	8.75	95
	Saturday ...	337	3.5	96
No. 3, S.	Monday ...	843	7.5	112
Age 26.	Tuesday ...	737	8.75	84
Weight 63.5.	Wednesday ...	878	8.75	100
Height 1.80.	Thursday ...	792	9.25	86
Surface 1.77.	Friday ...	735	8.75	84
	Saturday ...	269	3.5	77
No. 4, B.	Monday ...	857	7.5	114
Age 26.	Tuesday ...	955	8.75	110
Weight 72.6.	Wednesday ...	1,035	8.75	125
Height 1.78.	Thursday ...	1,229	9.25	133
Surface 1.86.	Friday ...	892	8.75	02
	Saturday ...	380	3.5	109
		18,789	183.0	103 ± 2

18,789 calories in 183 hours = 103 calories per hour.

CONCLUSION.

The average rate of energy-output (gross) at the printing rooms of the BRITISH MEDICAL JOURNAL, gauged as described above on four compositors for one week, comes out as: 101 to 105 calories per hour.

I shall be very interested to learn from your own observations at the Chelsea Polytechnic what are the average rates of energy-output per head:

(*a*) For a class of students sitting at lecture.
(*b*) For a class of students during physical exercise drill.

AN ATTENUATED TUBERCLE VACCINE.

BY

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THE object of this short paper is to bring to the notice of the profession a vaccine which in my own experience has been of great service in the treatment of tuberculosis.

Whilst not claiming it to be a specific remedy, it has a remarkable power of controlling the disease and of limiting the spread of the infection in the human body. As is well known, tuberculosis has a tendency to spontaneous cure, and if we can in any way limit the spread of the infection we are placing the patient in a better position by his natural powers of resistance to deal successfully with the original focus. In the BRITISH MEDICAL JOURNAL of January 31st, 1903, I expressed the opinion (as I believe for the first time, and based almost exclusively on clinical and pathological evidence) that

> Human and bovine tuberculosis were separate and distinct diseases, *but* that the human body was susceptible to both, and especially to bovine tuberculosis in the early periods of life. The two diseases were so rarely seen together in the human subject that there seemed strong grounds for presuming that they were antagonistic to each other, and that bovine tuberculosis may confer an immunity against human tuberculosis, and vice versa.

To take an example: A child with primary abdominal tuberculosis or tuberculous glands in the neck—both bovine infections caused by tuberculous milk—is protected against a primary pulmonary tuberculosis; on the other hand, a case of primary pulmonary tuberculosis from inhalation—always caused by the human bacillus—is protected against the lesions caused by the bovine bacillus. In other words, the two types of the bacillus—human and bovine—cannot exist in the body at the same time, and I have never been able to recover both types from the same patient.

The lungs are frequently attacked in the course of a bovine infection either by direct lymphatic extension from the abdomen to the bronchial glands; by direct extension to the apex of the lung from glands in the neck; or in the course of a general blood-stream infection.

For these reasons, and after treating over 3,000 cases of tuberculosis in hospital with tuberculins from various sources, I have come to the conclusion that the best results are obtained by treating human infections with bovine tuberculin, and bovine infections with human tuberculin. Although the results in many cases were good, I must confess on the whole to a feeling of disappointment, and I attributed it to the uncertainty of origin of the tuberculin, which was prepared in many instances from a highly virulent culture, and also to the tuberculin becoming stale and inert by lapse of time. In many cases acute and serious reactions followed its use; in others it seemed to be inert.

For these reasons I decided over fourteen years ago to endeavour to obtain attenuated cultures of bacilli, and to try the effects of a tuberculin prepared from cultures of low virulence and less toxicity. The late Professor Koch gave me in 1905 a pure culture of human tubercle prepared from the sputum of pulmonary tuberculosis; Professor Calmette of Lille, one of bovine tubercle; and Professor Bang of Copenhagen, one of avian tubercle. These original cultures have been subcultured every month since 1905 without any intermission, and to-day they grow true to type, quite normally, although not quite so luxuriantly. The present cultures, which are growing at the Lister Institute, are, of course, highly attenuated and of very low virulence. I have injected them into animals, and they are practically non-pathogenic.

I treated several patients with this tuberculin in 1914, but the war came, and my work was interrupted by a long residence in France. The results were most satisfactory, but I propose to wait for some time before coming to a definite decision.

Tuberculosis is seriously increasing in all the late belligerent countries, due to the stress and rigour of war conditions and the malnutrition of the people, more especially children. We have not yet discovered a specific remedy for the disease, but it is our duty to adopt every possible means to prevent its further spread, and in my

opinion the careful administration of tuberculin on scientific lines will do a great deal to limit the infection.

I venture to make the following suggestions regarding its use:

1. Tuberculin should be prepared from attenuated and non-virulent cultures of bacilli.
2. It should be freshly prepared and used within a week.
3. Given in graduated and increasing doses at intervals of seven days.
4. Acute reactions are not necessary.
5. Not less than twelve injections should be given at intervals of one week, but in some cases a great many more injections are required.
6. The most favourable cases for treatment are local lesions, but early cases of pulmonary tuberculosis may be limited and a further spread to other parts of the lung prevented.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

PARAFFIN WAX FOR FIRST-AID TREATMENT IN BURNS.

THE use of paraffin No. 7 in the treatment of burns and various forms of ulceration is well known, but it has occurred to me that ordinary hard paraffin would be an ideal first dressing for a burn through the protection it would afford and the complete absence of pain on removal. Paraffin candles, found in most houses, afford the material necessary, and it is simplicity itself to light the candle and allow the wax to gutter on to the burn.

Attention must be given to several small points: The candle must be held at a fair distance—about 10 in.—so that the paraffin is not too hot when it falls upon the injured part, and it is well not to keep dropping on one place but to dodge about over the surface; a mass of melted wax in one place is painful. The dressing can be completed by putting a small piece of clean linen or cotton-wool over the wax and dropping some more upon it. The heat of the burning candle seems to be sufficient to sterilize the wax, and, in any case, I should suppose that paraffin is not a substance likely to afford much nourishment to micro-organisms.

I have tried this method in a number of cases and found no ill effects; perhaps the healing action is not quite so rapid as with paraffin No. 7, but the painlessness is equal.

Alconbury Hill, Hunts. J. R. GARROOD, M.D.

PARENTAL BLOOD IN HAEMORRHAGE OF THE NEWBORN.

I HAVE met with three cases of haemorrhage of the newborn during my twenty-one years of practice here. The first case died, the two last recovered.

The first case, a female infant, was treated on the usual old-fashioned lines of drug treatment, but died in spite of every effort. The necropsy revealed only the ordinary negative findings.

The two later cases were treated by the subcutaneous injection of the parent's blood, of the father in the first case and of the mother in the second. Magnesium sulphate solution, saturated, was employed to prevent clotting. The effect was immediate and successful.

The notes of the third case are these:

A female infant, full term, well nourished, was born after normal labour on March 8th, 1920. The mother's age was 40. Eight years had elapsed since the previous confinement.

At 1 a.m. on March 11th the child vomited blood and passed some eight or nine abundant stools of blood. I saw her at 1 p.m. and found her feeble and passive—in the condition, in fact, of a child who had lost a great quantity of blood.

I immediately gave the infant an injection of 6 c.cm. of the mother's blood in the right flank. To obtain this blood, some saturated solution of magnesium sulphate was placed in an egg-cup in a saucepan of boiling water, and the 5 c.cm. Record syringe was sterilized in the boiling water. Half a cubic centimetre of the magnesium sulphate solution was drawn into the syringe, and this was then filled with the mother's blood taken from the median basilic vein in the usual manner.

The next action of the bowels was at 7 p.m., and during the night there were four other stools. A stool was passed at 9 a.m. the next day, and again at 7 p.m. All these were black, but contained no fresh blood. A stool passed at 10 p.m. was of the normal character and yellow colour. That at 7 p.m. was a mixture of black and yellow. The child, being too feeble to suck, had been fed by the spoon with mother's milk, drawn by the breast pump; as the quantity was scanty it was supplemented by diluted cow's milk. All the warm water possible was given also, between the feeds. The further progress to recovery was sure and uneventful.

It is extraordinary that since writing the above I have met with my fourth case. A male infant, born on March 31st, vomited blood on April 1st. In this case I was unable to obtain more than 1 c.cm. from the father, as he had a very serious convulsive seizure—due, I presume, to the cerebral ischaemia of a grave faint brought on by the operation—whilst I was drawing off the blood from his arm. I therefore supplemented this by a further 2 c.cm. from the mother, thus giving 3 c.cm. in all. The progress of the case was uneventfully successful.

In the first, third, and fourth cases here recorded the child was the second of the family. In the second case I am unable to trace the parents, and do not recollect what place in the family the child took, and I cannot find any note on the point.

Melton Mowbray. MONTAGUE DIXON, M.D., B.Sc.Lond., M.R.C.S., L.R.C.P.

Reports of Societies.

MODES OF ANAESTHESIA.

AT a meeting of the Sheffield Medico-Chirurgical Society on April 1st a discussion was held on anaesthetics.

Mr. HERBERT HALLAM, after comparing the merits of ether and chloroform, said that the only two safeguards against overdose of the latter were a knowledge of its physiological action and the maintenance of a free airway. He enunciated his theory of the cause of chloroform overdose as follows:

Air containing chloroform enters the lung alveoli and the vapour is absorbed by the blood, such absorption depending on (1) the percentage of chloroform in the inhaled air, (2) the air pressure in the alveoli. Thus a current of air containing chloroform goes in and out of the lung alveoli, and as more vapour is absorbed the characteristic signs of anaesthesia develop. If this exchange occurs with freedom all is well, but if any interference with respiration occurs through obstruction the situation becomes one of extreme danger. Nature's remedy for obstruction is expiratory effort, and the combination of expiratory effort and obstruction raises the alveolar pressure and alters the composition of the residual air; consequently rapid absorption of chloroform occurs leading to an overdose. The patient is poisoned not from the chloroform on the mask, but from that in his alveoli.

Illustrations in support of this theory were: (1) In the operation for tonsils and adenoids a patient "lightly under" might through lingual obstruction or the manipulations of the surgeon become suddenly poisoned. (2) The absence of poisoning where intratracheal administration by catheter was employed and there was free airway. (3) The rapid recovery from poisoning when by removing obstruction and performing artificial respiration intra-alveolar pressure was rectified. Mr. Hallam also referred to the question of idiosyncrasy to chloroform and the value of suggestion before operation.

Dr. W. DAKIN MART demonstrated Boyle's gas and oxygen apparatus, laying stress on the importance of systematic preliminary arrangement of the accessory appliances. He advocated preliminary medication with morphine $\frac{1}{4}$ grain and atropine $\frac{1}{150}$ grain, twenty minutes before the start of the operation. In abdominal operations the abdominal wall should be anaesthetized (after the patient was under) by means of $\frac{1}{2}$ per cent. novocain and $\frac{1}{4}$ per cent. potassium sulphate given independently and injected layer by layer. This prevented the occurrence of pain after coming round, and so enabled the patient to breathe more deeply, and clear the lungs more quickly. It was desirable to start the induction with a pressure of one "hole" of oxygen and three of nitrous oxide. The patient first breathed air until the bag was three-quarters full of this mixture, when the valves were turned on and he breathed from the bag and into the air. Then rebreathing in and out of the bag began. The colour of the ears should be watched; if they became dusky more oxygen should be given.

The signs of complete anaesthesia were regular quiet breathing (sometimes difficult to obtain), pupils small and active, eyes moving, and a normal pink colour. The signs of deep anaesthesia were snoring (difficult to avoid with the rebreathing mechanism), dusky tinge, jactitation, rolling of the eyeballs, and dilatation of the pupils. These signs indicated that more oxygen should be given. Suitable cases were amputations, chest cases, those suffering from severe shock or from pneumonia and bronchitis. Nose and throat cases were difficult to anaesthetize by this method. Advantages over other methods were: No fall of blood pressure, very little vomiting, rapid recovery from the anaesthetic, and often an improved general condition of the patient after the operation.

Dr. FAVELL demonstrated Marshall's apparatus for gas and oxygen, and many other members took part in the discussion, including Dr. ROBERTSON, Dr. HILLIER, Dr. SNEDDON, Dr. MILNER, Dr. HOLROYD, Dr. STEDMAN, and the PRESIDENT.

CONSTRICTION OF URETER.

AT a meeting of the North of England Obstetrical and Gynaecological Society, held at Sheffield on March 19th, the President, Mr. MILES H. PHILLIPS, read a short paper on unilateral pelvo-abdominal pain due to constriction of the ureter. The type of patient he had in mind complained of a definite, localized and clearly described pelvic or pelvo-abdominal pain intensified by menstruation and for which the most careful pelvic examination or even abdominal exploration could find no satisfactory explanation. By a study of the following cases he showed that constriction of a ureter by scar tissue or other band was a sufficiently likely cause to warrant exploration with the cystoscope and ureteral catheter.

Case 1.—Pain in right iliac and lumbar regions, commencing three days after hysterectomy for fibroid, causing post-partum haemorrhage. Pain persisted although the general condition was steadily improving. Bladder examined a fortnight after operation, and right ureter seen to be acting less frequently and ejecting a smaller stream of urine than the left. At further examinations, a week and fourteen days later, right ureter apparently blocked. Abdomen reopened and affected ureter found dilated at pelvic brim and constricted about one inch from bladder by a tough fibrous cord containing vessels and evidently resulting from tissue dragged inwards and included in the ligature round right uterine artery at previous operation. Division of cord was followed by rapid recovery and no further pain.

Case 2.—Pain in left iliac and lumbar regions dating from confinement seventeen years previously. Menorrhagia and premenstrual exacerbation of pain. No enlargement of left kidney. Cervix deeply split on left side and firm scar in left fornix. Abdomen opened and left ureter found distended above point opposite cervix where it plunged into dense mass of scar tissue. Ureter separated with difficulty and hysterectomy performed. Operation two years ago, and no pain since.

Case 3.—Single girl. Pain in right iliac fossa, commencing in 1914. Dilatation of cervix brought no relief. Right kidney unduly mobile. Kidney fixed to fascia and muscles of loin eighteen months later, but pain continued. Abdomen opened after further interval of eighteen months. Uterus, appendages, and vermiform appendix normal. Right kidney well fixed. Extensive Jackson's membrane across ascending colon, and strong peritoneal bands about caecum. Right ureter bound by fibrous band hardly more than ridge of peritoneum, at point 2 in. above pelvic brim. Band divided and patient perfectly relieved.

In none of the cases was there any tangible enlargement of the kidney, but a hydronephrosis would probably have resulted had the obstruction not been removed. The symptoms complained of were those of early ureteric obstruction, and the fact that an increase in pain occurred before or during menstruation brought such cases under the care of the gynaecologist.

Factors in Abortion.

Drs. DOUGAL and BRIDE (Manchester) read a paper on factors causing abortion, based on a clinical and pathological examination of 100 consecutive cases of abortion admitted to the maternity department of St. Mary's Hospital, Manchester. The authors pointed out that the work was in the nature of an experiment, and that 100 cases were too small a number on which to base authoritative results. They hoped, however, to continue the work along similar lines. The following conclusions were arrived at as the result of the investigation:

(1) Abortion occurs most commonly between the third and fourth months. (2) It is comparatively uncommon in primiparae—less than one-fifth of the series belonged to this category. Most women who abort have borne previous full-term children, and, in a majority of cases, more than one. Frequent abortions in the same patient are uncommon, and not necessarily due to syphilis. (3) As regards the factors producing abortion, accidental and reflex causes account for 18 per cent., general disease of the mother 7 per cent., disease or displacement of the mother's genital organs 12 per cent., and gross abnormalities of the fetus, cord, or placenta other than those due to haemorrhage and infarction, 6 per cent.

They considered that the importance of syphilis as a cause of abortion had been somewhat exaggerated. The Wassermann reaction was positive in 12 cases, but in half of these some other abnormal condition was present which by itself might have produced the abortion. In only one case were clinical signs of syphilis present, and in no specimen could typical syphilitic changes or spirochaetes be demonstrated. They estimated at not more than 10, and probably nearer 8, the percentage of cases in which syphilis produced abortion. The percentage of self-induced cases was difficult to estimate, but probably not less than 20 per cent. Ten patients in the series admitted that they had wilfully brought on abortion, and eight employed lead pills for the purpose. In 30 per cent. of the cases no cause could be assigned, and pathological investigation threw little additional light on the subject. It appeared, however, that in the great majority of cases the mother was at fault as the result of some diseased condition, whether of an organic nature or merely an increased irritability of the centres presiding over the expulsive action of the uterus.

Reviews.

GENERAL PHYSIOLOGY.

IT is always refreshing to find a familiar subject treated in a new fashion. Will fresh light, one asks, be thrown on the old material? will thought be stimulated? Professor M. ARTHUS, in his book *La Physiologie*,[1] has in some respects broken new ground so far as the systematic treatment of his subject matter goes. Is he successful? does he stimulate thought? does he charm or irritate? does he point to new horizons? The book certainly is interesting; it has its value. Physiology is discussed in a fresh way, but somehow it fails to satisfy. It is difficult in the first place to understand for what audience the book has been prepared. At one moment it would appear to be for students of medicine who have a fair knowledge of the subject; at another it might be presumed it was for the intelligent layman without specialized knowledge. Like all such volumes it is weakened by its attempt to meet every demand.

The volume is curiously arranged. It is divided into two books called (I) the methods, and (II) the results and hypotheses, respectively. The first book is in turn subdivided into three parts: (1) Observation, (2) experiment, (3) pathology; the second book consists of one part only. Under the heading observation, the various methods by which our information is obtained are discussed in rather a perfunctory fashion; under experiments there is a wide range of discussion, from the choice of the animal on which the observations are to be made, to the interpretation to be put upon the observed facts; finally, under the heading pathology there is a rather thin disquisition on the interrelation between the study of the normal and the abnormal, and more particularly on the question whether the physiological observations made on animals can be applied to man. Such matters as cerebral localization, hepatic disease, myxoedema, and diabetes are discussed, and it is shown how the information collected by laboratory methods is applicable to the human subject. Stress is quite properly laid on the fact that there ought to be much more intimate co-operation between the physiologist and the practising medical man, that the advantages to be

[1] *La Physiologie.* Par Maurice Arthus, Correspondant national de l'Académie de Médecine, etc. Paris: Masson et Cie. 1920. (Cr. 8vo, pp. 430. Fr. 10 net.)

gained are mutual, that by keeping touch with the practical applications of his science the physiologist will perform more useful work, and that the medical man, by following the advances in physiological science, will find his work lightened and rendered infinitely more interesting.

The second book, on results and hypotheses, is much more interesting, dealing as it does with the more speculative side of the question, but it is precisely this book which causes the disappointment. The field is so inviting, so little has been done in recent years to correlate the various hypotheses or to attack the effete and the shams. The introduction is so promising. The physiologist is no mere collector of facts; he discusses them, he interprets them, he classifies them, and he arrives through them at the great laws which preside over the manifestations of life. This work is not exclusively physiological, it is also philosophical; but the physiologist can undertake it because *il y a toujours un philosophe que sommeille au fond d'une âme physiologique*. It is true every word of it, but M. Arthus has failed to justify the faith that is in him. The mechanists, self-appointed guardians of the physiological shrine, may dissent; but it is a fact that, simply because no one has had either the courage or the necessary training, with the notable exception of Dr. John Haldane, to tackle the mass of physiological facts in a philosophic manner, modern physiology tends year by year to assume the appearance of a mass of ugly conglomerate. Some day M. Arthus may be tempted to write a shorter book in which he will allow his fancy freer rein; then we may expect an essay which will be both stimulating and charming. As it is, however, the present volume can be strongly recommended to all medical students and practitioners who desire a knowledge of the applications of physiology.

CYSTOSCOPY AND URETHROSCOPY.

THE task of translating a standard work and of ensuring that it loses as little as possible of its original vitality in the process is not light. It is fortunate, therefore, that LUYS should have confided the production of the volume *Cystoscopy and Urethroscopy*[2] to the competent hands of Dr. ABRAHAM WOLBARST, who is himself an eminent urologist, and, as he confesses, an ardent admirer of the French author. He feels that in extending more widely amongst English-speaking urologists the knowledge of Luys's important treatise, he is not only performing an act of homage to its distinguished author, but also contributing to the progress of genito-urinary science. Luys's avowed object in writing his treatise was to illustrate and popularize the use of direct vision cystoscopy and urethroscopy. Neither in Great Britain nor in America has this method of cystoscopy received the extensive recognition that has been accorded to the indirect method. Whatever may be the reason for this marked preference for indirect cystoscopy, urology will surely gain in both countries from a clear exposition of the direct method.

Luys's book is worthy of an important position in the library of the urologist as a standard reference work on the science of endoscopy. It contains an extensive and illuminating account of the origin and development of cystoscopy and urethroscopy. Various types of urethroscope and cystoscope are described, beginning with those employed in the earlier days of the science, and concluding with the more modern instruments. Both indirect and direct methods are passed under review, the author finally giving judgement in favour of the latter. His reasons for preferring direct cystoscopy are, in the first place, that in it the personal equation is reduced to a minimum; far less experience is required in interpreting the view of the bladder obtained in direct cystoscopy than that furnished by the indirect instrument. The bladder wall may be viewed not only full-faced but in profile, a facility which permits of slight elevations and depressions being detected. In addition to this, the colour of the mucous membrane appears more natural under air than under water distension, and no difficulty is experienced in viewing a contracted viscus which cannot be properly distended. Luys also claims that haematuria and pyuria are less troublesome with direct cystoscopy and under greater control. Finally, he claims that this method is the only one applicable to cases of vesical fistula, and that it permits of cystoscopy in pregnancy and in cases of abdominal tumour. It is, he asserts, vastly more convenient when treatment is required. As a set-off to these weighty advantages he mentions the diminution in the visual field with the direct cystoscope, the necessity for employing an instrument of large calibre, and the occasional failure to obtain sufficient unfolding of the vesical walls. To these objections we should have added the greater discomfort inflicted on the patient.

After giving Luys's reasons for preferring the direct method of cystoscopy, the translator and editor has inserted a summary of the position as viewed by an American advocate of indirect cystoscopy, Dr. W. F. Braasch; it is a very fair review of the question, and while maintaining the preference of the majority of American urologists for the indirect instrument, the advantages of direct cystoscopy in certain special cases are admitted.

The book contains a great many illustrations and coloured plates representing various pathological conditions of the bladder and urethra. Although some of these illustrate rarities that may very seldom be encountered, they are rightly included in a book that aims at being a comprehensive and complete work of reference.

ATLAS OF SYPHILIS.

INTRODUCED with a foreword by the Director-General A.M.S., the large and expensive *Atlas of the Primary and Cutaneous Lesions of Acquired Syphilis in the Male*,[3] by Major WHITE and Dr. BROWN, is based on the experience gained from some 19,000 cases of syphilis seen at a large venereal hospital; of these many were suitable for the taking of photographic records. The urgency of the problem of the early diagnosis and treatment of syphilis is universally recognized, and the authors of this *Atlas* have set up as its chief aim the giving of assistance in the early diagnosis of the disease; the majority of the pictures, photographic or coloured, are of its primary and secondary manifestations.

The primary syphilitic and non-syphilitic sores are described in considerable detail, as their early recognition is so essential; the text is in no sense a treatise on syphilis, but confines itself strictly to questions of diagnosis. It is interesting to note that multiple primary chancres were observed in 19 per cent. of 9,000 cases analysed; 834 patients showed two each, and four patients had respectively as many as 14, 15, 16, and 49 primary chancres apiece; it is pointed out that the presence of external abrasions (such as those produced by *Acarus scabiei*) predisposes to multiplicity of the primary lesions in syphilis. The seventy-nine photographs, many of them in stereoscopic view, and the five coloured plates are all excellently reproduced, and do equal credit to their artists and to the printer. The authors of this *Atlas* are to be congratulated, and their work should be of great service to medical students and workers in venereal clinics all the world over.

ITALIAN WAR SURGERY.

FORNI, in a modest, workmanlike account of an Italian surgeon's experience with a surgical ambulance during the war,[4] records 60 cases of cranial and cranio-cerebral wounds and 38 cases of penetrating wounds of the abdomen. The cases are described in detail and illustrated by 58 photographic reproductions showing the nature of the wounds. The first chapter is devoted to cranial wounds without lesion of the dura (8 in the frontal region, 9 in the parietal, 4 in the occipital, 2 at the base). The second chapter deals with wounds affecting the cerebrum as well as the cranium, and comprises 32 cases. In the next chapter the author discusses the pathological anatomy and symptomatology of both groups

[2] *A Treatise on Cystoscopy and Urethroscopy.* By Dr. Georges Luys. Translated and edited with additions by Abr. L. Wolbarst, M.D., Cystoscopist, Beth Israel Hospital. London: H. Kimpton, 1918. (Sup. roy. 8vo, pp. 386; 217 figures; 24 plates, including 76 drawings from original water colours.)

[3] *An Atlas of the Primary and Cutaneous Lesions of Acquired Syphilis in the Male.* By Charles F. White, O.B.E., M.B., and W. Herbert Brown, M.D. London: John Bale, Sons, and Danielsson, Ltd. 1920. (Double demy 8vo, pp. 32; 79 photographs, 4 coloured plates. 27s. 6d. net.)

[4] *Ferite del Capo e dell' Addome in un Ambulanza Chirurgica d'Armata.* By Dott. G. G. Forni, Libero docente nell' Universita di Bologna. Bologna: L. Cappelli. 1919. (Sup. roy. 8vo, pp. 181; 58 figures.)

of cases. Like most surgeons he points out that there is no certain relation between the injuries of the soft parts and those of the skull and encephalon, hence the necessity of careful and thorough exploration of all the wounds. Early symptoms pointing to cerebral lesions may sometimes clear off quickly, and prove to be merely due to shock; but, on the other hand, serious injury may be slow in showing definite signs and symptoms. Arrhythmia is usually of bad omen, even when the general and local symptoms suggest a hopeful prognosis. On the important question whether the dura should be opened in cranial wounds or left alone, the author expresses the opinion that it is necessary only in a relatively small number of cases, and only when symptoms of compression develop and either do not disappear or become accentuated. The author records 26 cases in which fragments of shell or other foreign bodies were present. The much more fatal character of cranio-cerebral wounds when compared with cranial wounds is shown by the mortality—for example, out of 28 operated on for cranial wounds only 1 died, whereas out of 32 with cranio-cerebral wounds 14 died.

The second part of the book is devoted to penetrating wounds of the abdomen; the cases related comprise 24 penetrating wounds with lesions of the gastro-intestinal tube, 5 with injury to intestines and parenchymatous organs, 6 with injury to pancreas and bladder, 2 with multiple lesions, and 2 with visceral lesions. Of the 38 operated on, 20 recovered and 18 died. Ether was used as anaesthetic if possible. One of the signs to which the author attached much value as establishing the diagnosis of penetration was the abdominal pain, whether spontaneous or provoked, and the rigidity of the abdomen. The state of the pulse as regards its strength and frequency was more valuable in prognosis than in diagnosis. Absence of hepatic dullness or presence of fluid in the abdomen were of comparatively slight importance, or at any rate not much attention was paid to them.

Clear straightforward accounts of surgical experiences such as Forni provides in his book form valuable additions to the large amount of surgical war literature. The collation and critical examination of such contributions to surgery ought to add much valuable information to our knowledge of the class of cases dealt with and help to fix the best mode of treatment for some years to come. There is nothing new or specific about war surgery, but the frank records of war surgeons of capacity must always be of value.

TEAM WORK IN HOOKWORM DISEASE.

DR. H. H. HOWARD, who is Director for the West Indies under the International Health Board of the Rockefeller Foundation, has published a practical book on the control of hookworm disease.[5] He describes very fully the work and composition of a field unit. The medical director sees all cases before curative treatment is commenced, is in administrative charge, and directs propaganda; four microscopists are recruited locally, one of whom is in charge of the others, and confirms all positive findings; twelve nurses collect specimens from the whole population of the area, and administer anthelmintic treatment as the medical director prescribes; the unit is completed by clerks and menials.

The aim of the Rockefeller Foundation in putting such teams in the field in various parts of tropical and subtropical America is the complete eradication of the ankylostome from the countries under treatment—its eradication, moreover, within a period of months. It is in this sense that their methods are intensive. To realize the courageousness of the undertaking it is only necessary to remember that more than half the population in these countries is infested with hookworm. Undoubtedly the intensive radical method is the only one that can in the end be successful. It is costly of course, but much less so than the treatment of those who present themselves, while the mass of the population, including of course the mild cases and the carriers, is left untouched. Eradication is of course the aim of certain tea-planters' associations whose coolies are infested with these worms; but only too often they content themselves with treating cases and effecting sanitary improvements. The aim is too low, and in the end it is found that the work has been expensive and useless.

Dr. Howard's book deals solely with administration and the organization of a campaign. It tells us how the units are equipped and paid, how long it should take to treat a given population, and what are the dangers of the administration of thymol. Specimens of case records, microscopists' report forms, and popular handbills are given, and the index is good.

[5] *The Control of Hookworm Disease by the Intensive Method.* By H. H. Howard, M.D. New York City: The Rockefeller Foundation. 1919. (Demy 8vo, pp. 189; 24 figures.)

MODERN SPIRITISM.

DR. SCHOFIELD'S book, *Modern Spiritism*,[6] it is stated in the preface, was written at the earnest request of a medical friend to present "to the public some fairly comprehensive monograph on the subject." He is anxious that his account of the matter should be found impartial; he is repelled by the publications of some recent converts, and is impressed by the danger for persons of unstable equilibrium who accept the invitation to investigate the alleged phenomena. The author's own view may perhaps best be described as orthodox in the theological, Christian sense. Thus he holds that the true Bible spiritualism is a noble science, and protests against its degradation by the modern spiritism of to-day. He points out that even spiritists recoil with disgust from the pranks, too often marked by falsehood and deception, that so frequently characterize their meetings, and quotes Maeterlinck as saying that the unknown power moves tables, produces flowers, ghosts, and so on, "all on one condition: that all performances must be without rhyme or reason, vain and puerile." The net result is not only disappointing; it is also undoubtedly dangerous to spirit and body. The atmosphere is profoundly unhealthy, repellent to common sense, and repugnant to reason. As a religion it has no firm basis, being sometimes pantheistic, at other times atheistic or purely "modernistic." Dr. Schofield holds, however, that there is a residuum of truth in so-called phenomena attributable partly to the "unconscious" mind of the medium, and partly to the existence of evil spirits, which are not spirits of the departed. As against this ingenuous view the sceptic may say that where so much is fraud, is it not possible that the residuum may have but little better basis? There is a most illuminating story in Dr. Schofield's book of a séance at the house of Mr. W. T. Stead, whereat were all the surroundings necessary for spiritist "truth"—special atmosphere, special attitude, and special apparatus. The room was darkened, hands were held tightly; there was strained attention, earnest expectation, intense desire to see something. In this atmosphere, after grave scientists had crooned American revival hymns for two hours, manifestations took place. It was in vain that the two American performers had asserted that they were not mediums, but only professional entertainers. The effect of what Dr. Schofield calls "collective hypnosis" was such that the company went away convinced that the manifestations were genuine.

While sympathy may be felt with Dr. Schofield's plea that powers exist with which we are not fully acquainted, it may be doubted whether he is justified in asserting that "auras are facts, and not the imagination of visionaries or the fancies of the mediaeval." And is it quite fair to class together hypnotism, telepathy, and wireless telegraphy as if they were of equal validity? Perhaps Dr. Schofield is inclined to hasty statements without taking sufficient pains to verify his references. At all events, it is rare to meet with three errors in two lines of print, as in the assertion that *Henry* Irving founded the *Holy Apostolic Church* or Church of the *Latter Day Saints*.

[6] *Modern Spiritism.* Its Science and Religion. By A. T. Schofield, M.D. London: J. and A. Churchill. 1920. (Cr. 8vo, pp. viii+259. 3s. 6d. net.)

NOTES ON BOOKS.

The Road to Endor[7] is an account of how two officers, Lieutenant E. H. JONES, I.A.R.O., and Lieutenant C. W. HILL, R.A.F., contrived their escape from a Turkish prisoners' camp. It is noteworthy for two reasons, for

[7] *The Road to Endor.* Being an account of how Two Prisoners of War at Yozgad in Turkey won their way to Freedom. By E. H. Jones, Lieutenant I.A.R.O. With illustrations by C. W. Hill, Lieutenant R.A.F. London: John Lane. New York: John Lane Co. 1920. (Cr. 8vo, pp. xiii+351. 8s. 6d.)

in it is described with much wealth of detail the *modus operandi* of avowedly "faked" mediumistic séances; the later part of the book tells how these enterprising and courageous officers simulated madness in order to obtain their release. The story of their pluck, endurance, and resource in the pursuit of freedom is enthralling. In order to complete the picture of mental derangement they even went the length of half-strangling themselves. Later on, in Constantinople, Lieutenant Jones, who was malingering as a case of general paralysis of the insane, had to undergo lumbar puncture for diagnostic purposes. "They then tackled my spine. I saw an orderly blow down the hollow needle and *wipe it on the back of his breeches* before handing it over to the doctors, and it nearly gave me a fit . . . for I knew enough about needles to be in mortal terror of a dirty one." There is much food for thought in this book; people who are inclined to look indulgently on spiritualism will find the subject treated with much candour and ability; its perusal may render them less likely to be dazzled by the glamour lent to the cult by some great names in modern science.

The chemistry of colloids has made great strides during the present century, finding as it does so many applications in technical chemistry as well as in the chemistry of the physiological or physical laboratory. Dr. HATSCHEK has done the science good service by publishing a *Laboratory Manual of Elementary Colloid Chemistry*;[8] its scope is clearly expressed in the title. General theories are not discussed, but accurate and detailed directions are given for carrying out the fundamental operations, for making a number of representative preparations, and for examining them by standard methods. Simple examples have been chosen, involving little expense for apparatus or material; references to the more recent literature are given at the end of each chapter. The book is clearly written, and should be available in every physiological laboratory.

The plastic surgery of the face is one of the many special departments of surgery brought into prominence by the war. In France this led to the creation of regional chief maxillo-facial surgeons with staffs to attend to the many cases of this class. Dr. HERPIN, who was a chief surgeon in charge of stomatology at Bordeaux, has written a valuable account of the various surgical treatments adopted by himself and his colleagues in these patients in a monograph on gunshot wounds of the lower jaw[9] which is full of detail, well illustrated, and based on a considerable personal experience. At the time of writing he was able to classify 572 of his 619 cases as "evacuated cured," and 11 were referred to auxiliary services; only 2 were discharged from the service, while 34 were convalescent or under treatment. The book is clearly written, and should be in the hands of surgeons dealing with cases of the class with which it is concerned.

Chemistry for Public Health Students,[10] by E. GABRIEL JONES, contains full and clearly written instructions for the performance of the experimental work in chemistry which is required by those preparing for the D.P.H. examination. Methods are adequately described, and at the same time brief but clear accounts of the principles involved are not lacking; particular attention is devoted to calculations. Concise notes are given in each chapter on the more important matters concerning public health in connexion with water, air, milk, etc. Chiefly useful as a manual of practical instruction, this volume will also serve the candidate who is revising his knowledge, as a partial substitute for the use of larger textbooks and of monographs. It contains a number of examination questions and a useful bibliography.

[8] *Laboratory Manual of Elementary Colloid Chemistry.* By Emil Hatschek. London: J. and A. Churchill. 1920. (Cr. 8vo, pp. 135; 20 figures. 6s. 6d. net.)

[9] *Les fractures de guerre du maxillaire inférieur.* Par Dr. A. Herpin, Chef de service de Stomatologie de la 18e région (Centre de Bordeaux). Paris: Félix Alcan. (Royal 8vo, pp. viii + 155; 100 figures. Fr. 4.40.)

[10] *Chemistry for Public Health Students.* By E. Gabriel Jones, M.Sc., F.I.C. London: Methuen and Co. 1920. (Cr. 8vo, pp. ix + 244. 6s. net.)

A SWISS medical congress will be held at Berne on June 5th and 6th.

THE deaths which occurred in the Italian sanitary service during the war were as follows: Medical officers, 1,060, including 377 killed in action, 216 students, 40 dispensers, 40 chaplains, 33 nursing sisters, and 11 Red Cross staff.

MOTOR NOTES FOR MEDICAL MEN.

By H. MASSAC BUIST.

CAR LIGHTING PROBLEMS.

DOCTORS are concerned perhaps more than any other class of the community with the matter of the safe lighting of road vehicles. It is unfortunate that, in connexion with the forthcoming regulations, it has practically been decided by the authorities that, as the dazzle problem has not been settled absolutely, the limitation of headlights must be enforced, despite the evidence furnished by existing devices. An instance was afforded by a demonstration, arranged by Messrs. C. A. Vandervell, which proved that some classes of lamps give much more glare than others. Everybody knows that it is possible to be blinded by an ordinary oil bicycle lamp, or, for that matter, by a gig lamp, because in the design of such lights no attempt was made to reduce dazzle.

The committee set up by the Ministry of Transport to investigate this problem has issued an interim report; it is still pursuing its investigations with regard to headlamps on motor vehicles, and though not in a position to make any definite recommendations, it states that the evidence heard, and the result of tests carried out, strongly point to the following conclusions:

1. No satisfactory practical dimming device to avoid dazzle has yet been discovered. Such devices as avoid dazzle to any appreciable extent unfortunately fail to give a safe driving light; also, of course, they cause an extremely large percentage of loss of lighting power.
2. Far too powerful headlights are in common use at the present time.
3. Pending the discovery of some satisfactory dimming device, a maximum power light sufficient to give a safe driving light should be fixed, and the reflectors in the case of all lights should be limited in size, varying in accordance with the power of the light.

This would not give us safe lighting or driving. Moreover, such a course would lead to the abandonment of the investigation of the problems of dazzle, and would put a premium on unscientific lamp construction, and cause the maximum dazzling effect with a bulb of the limit size—say 20 c.p.—because other road users would the more probably get out of the way of an oncoming vehicle so lit. All which would be regrettable.

THE FUEL QUESTION.

Governments respect votes; therefore it is to the interest of every medical man to do what he can to obtain signatures to a petition in regard to the high prices prevailing for motor fuel which the Automobile Association has organized on behalf of the public for presentation to the Prime Minister. The cost of the petition is being borne by the Automobile Association, which has over 100,000 members, all of them motorists. But it is not merely a motorists' petition; it is, on the contrary, a petition from all members of the community, including those who use omnibuses or whose concern in the present high price of fuel is due to the fact that their foodstuffs are brought to market or distributed by motor traction. Copies of the petition can be obtained from, and signatures will be received by, the Automobile Association, 66–68, Whitcomb Street, London, W.C.2.

It is not expected that a reduction in the price of petrol will be an immediate result of the petition; that would be impossible. What is required is a direct pronouncement of this kind, making it plain to the Government that the public is fully alive to the gravity of the present situation and determined to have the business put on a proper footing. Sir Hamar Greenwood, speaking as a member of the Government at the recent exhibition of marine motor plant at Olympia, Kensington, said that his colleagues were fully alive to the importance of the motor fuel question, and were taking every possible step to bring more and more of the production, as well as of the distribution, under the British flag. But this will take time, and it is useless to suggest, as Viscount Curzon, M.P., did on the same occasion, that because nothing could be done to produce an immediate effect on prices the petition to the Prime Minister would be useless. This is a mistake, for the more this or any future Government realizes that the whole public is concerned with the price of motor fuel the more prompt and the more sincere and unremitting will

be its efforts to see that new sources of production are opened up and alternative fuels provided.

WHAT IS BEING DONE.

At the moment every possible sort of oil well is being tested. Undoubtedly a result will be that the production of crude oils will be enormously expanded in the course of the next three to five years.

At the moment it is impossible to do anything material in the way of producing benzol because the coal miners are producing something like 50 per cent. short of what is needed for the bare requirements of our ordinary industries, apart altogether from the distillation of benzol from such coal. When the miners are prepared to work fairly in exchange for high wages, then we shall have sufficient coal to be able to distil much benzol. The Government is already keen on this, but it will be the keener as signatures are secured to such petitions as that being promoted by the Automobile Association and Motor Union. Therefore, as the average medical man in this age requires motor fuel in order to pursue his profession, it will be in his own interests as well as in that of the nation in general if he would, in his leisure moments this week, point out to any with whom he comes in contact that those petition forms should now be sent in to the Automobile Association, whether they have a few only or the full number of sixty signatures which each may carry. No form need be signed by a motorist. All that is needed is that the signatures should come from members of the public.

The price of fuel in America has risen. It is almost inevitable that there should be a corresponding rise in this country. Matters are likely to go worse before they become better. But in the measure in which they grow worse we are more assured of coming, and that at an earlier interval, to a more favourable state of affairs. The position at present is frankly impossible. The various nations are bidding against one another for the insufficient supplies of motor fuel in relation to the total demand.

THE ONLY WAY.

Unfortunately the motor fuel proposition is inextricably bound up with many others. It is not a case of one trust monopolizing the whole world. Instead there are many big rival corporations. Shortage of supplies in relation to world demand is the lever that raises the price. Further, the demand for motor fuel in America is advancing enormously because the motor vehicle industry there has not suffered any interruption of output and the agricultural motor, the use of which is rapidly extending, is making additional demands, so that the total world production of oil could be absorbed in the United States of America alone. Consequently it is impossible for our Government, or any other in Europe, to take up a dictatorial attitude. All that would happen as a result of that would be that the British market would be neglected and supplies sent elsewhere. So serious is the position that it is not altogether unlikely that, before the year is out, we may be rationed for motor fuel in this country just as we were during the war.

Of this the Government is better aware than the general public. It is concerned, of course, with oil as such, because we are a maritime people. The future power for ships must be furnished by oil fuel, not used in the liquid fuel internal combustion engine as far as the majority of ocean-going vessels is concerned, but by the burning of crude oil for the raising of steam. Some motorists vainly imagine that the more this market develops, the greater will be the prejudice wrought to, and the shortage of supplies for, passenger cars and utility motor vehicles. Than that nothing could be more wildly absurd. The first thing for the Government is to do everything to stimulate all the wells in the country being exploited as promptly as possible, and at the same time to bring into use all the possible oil wells in the British Empire, and after that to get as many as possible in foreign countries under British control.

The only way to do that is to encourage private enterprise of every sort and not grudge those who embark on it any profits they reap, because, provided the profits look big enough, they will go ahead in ever-increasing numbers, and the net result will be that, presently, supply will overtake demand; then commercial competition between them will cause the price to fall. This is the only possible way. Further, by looking at the matter in a broad way, and discussing oil rather than petrol, the greatest amount of progress will be made; because we must find a market for the residuary products of the crude oil, otherwise petrol can be produced only at utterly uncommercial prices. It is a fact that petrol sold in this country to-day yields practically no profit. That is why there is a likelihood of the price rising very shortly. This, of course, does not mean that the big petrol vending companies are not making enormous profits, but they are made out of selling their motor spirit outside this country. Shipping, distribution and kindred costs are so high that the profits are relatively negligible at present prices, for it must be kept in mind that prices are varying every week, and, unfortunately, all the variations that have taken place this year have been in an upward direction.

THE DANGERS OF ADVOCATING MONOPOLIES FOR MOTORISTS.

In face of the need to encourage, not to discourage, the development of oil fields, and the fact that it is quite impossible to talk about benzol being made available in sufficient quantities in this country, since the amount of coal raised must be increased by 50 per cent. if it is to suffice for the needs of our industries alone, far less for the needs of warming our houses and for our export trade, it is idle to suppose that any miracle can be performed that will give us all the benzol we need. The Government has in mind the development of the benzol industry and hopes also that presently alcohol fuel will become available in sufficient quantities.

The point is that motorists should never cease organizing, agitating, and, above all, educating the public by conversation at every possible turn concerning the importance to itself of sufficient liquid fuel supplies of all sorts. That is one reason why we ought to use the broad term "oil." Not only does oil make for greater economy; it is, besides, something that the public can appreciate as driving the ships to bring their foodstuffs and raw materials into this country and take exports away from it. Link that problem up in the public mind with road transport for personal convenience and the cheaper marketing of foodstuffs, and the public will begin to understand the importance of the oil era to the community at large. To argue, as some do, that utility motor vehicles should not be allowed to use either benzol or petrol is the most harmful thing that could be done for motoring in a democratic country and age. We shall never succeed by urging a monopoly for car users.

Our present sorry case should stimulate the evolution of very much lighter motor vehicles to ensure less consumption. Be that as may be, the point is that the situation is so grave that the Government dare not neglect it any longer. A result will be that, if enterprise continues to be accelerated at the rate to which it is being forced now, it is likely that in three years we shall arrive at a satisfactory situation. On the other hand, were there any slacking in the present, or any inclination on the part of the public not to force the Government's hand in the matter, unquestionably we should have to start three years hence and then probably it would take six years to put the situation right.

From all this it will be understood that the coming basis of the taxation of motor vehicles, which will be announced in the Budget, cannot possibly be, as would be ideal, by process of the fuel tax. The problem is too fraught with difficulties from the point of view of the Government—which is concerned, not with taxing fuel, but with getting sufficient fuel first, and then of getting it sufficiently cheaply—for it to be possible to raise revenue in that way, in face of the differentiation for home produced fuel, and of the difficulties of defining motor fuel for taxation purposes.

The sole tax on motoring of the passenger sort will probably be on the engine; though the method of rating may be different from that at present adopted by the Treasury. Whatever the method, engine rating is the least satisfactory way. It cannot be pretended that it bears any relation to the use of his motor vehicle enjoyed by the individual taxpayer. Further, it predetermines design and utterly fails to give any encouragement to the development of chassis construction or bodywork. Infinitely the better course would have been to tax vehicle

weight, as is proposed in regard to utility motor vehicles. That would encourage more economical motoring, lighter motor vehicles, and would not prejudice the method of design in any way.

FOREIGN MINERAL WATER RESORTS.

THE fact that we are now enjoying the blessings of peace—if indeed it be a fact—is turning the thoughts of the British, who are inveterate wanderers, towards the possibility of visiting foreign countries. Among these are a certain number of persons who wish to combine a holiday with spa treatment. We have recently received two communications, one from Dr. D. W. Samways, of Mentone, about Brides-les-Bains — sometimes called the French Carlsbad—and the other from Dr. T. Gerald Garry, of Cairo, about Pistany, called before its incorporation in the Czecho-Slovak Republic "Pöstyén."

BRIDES-LES-BAINS.

Brides-les-Bains, in Savoy, lies at an elevation of 1,800 ft., amidst, as Dr. Samways says, magnificent mountain scenery. Brides-Salins is two miles away. At Brides-les-Bains, where most visitors reside, the daily yield is about 100,000 gallons of water at 95° F. It is closely analogous to the Sprudel source at Carlsbad, there being about the same total mineralization, very similar constituents, and the same quantity of free carbonic acid gas. The output of medicinal water at Brides-Salins is very abundant—about one and a half million gallons daily. The temperature is 96° to 97° F. The principal source at Nauheim (the Frederic Wilhelm) has the same temperature, and, except that it is somewhat stronger, essentially the same composition as that at Salins, though as weaker waters are commonly employed in the earlier stages of treatment, the Salins waters are suitable for these stages, and, by concentration, for the later stages also. The concentration of carbonic acid gas at Nauheim is about half as much again as at Salins, but the superabundance of water at Salins is a great asset, and the private as well as the swimming baths are commonly taken in running water. Dr. Samways continues:

> Persons suffering from disorders affecting the abdominal organs, liver, stomach, intestines, or kidneys, will generally profit considerably by a course of waters at Brides. Gout, diabetes, and obesity are likewise treated. The waters at Salins are suitable for young people with enlarged glands, anaemia, chlorosis, and debility, and great numbers of French children are sent there, as also are convalescents generally. Cardiac cases are treated as at Nauheim. Women suffering from disorders peculiar to their sex were specially recommended to visit Brides by Professor Buchanan of Glasgow, who was much impressed by the value of the waters for these cases (*Glasgow Medical Journal*, December, 1889).
>
> It is many years since I practised at this wonderful little spa, but I have never seen in England or in France any spa which can compare with it for range of possibilities or inherent merit. It has, moreover, the additional advantage of being situated in the middle of one of the most beautiful districts in France.

Brides-les-Bains is reached by passing through Aix-les-Bains to the terminus of Moutiers, sixty miles beyond Aix and three miles from Brides. The best and usual season for English visitors is from the middle of May till the middle of July, after which it is almost impossible to find accommodation, while for English visitors it is too hot.

PISTANY.

Dr. Garry writes in praise of the therapeutic properties of the thermal water and mud available at Pistany in Czecho-Slovakia. They were praised in this JOURNAL as long ago as 1888 by the late Sir T. Spencer Wells, who spoke of the benefit derived by patients crippled through gout or rheumatism and by chronic diseases of the joint. Inveterate cases of sciatica, he said, had been cured, and also chronic periostitis and catarrhs of certain internal organs. Sir Spencer Wells added that "after the [then] last war a great many men who had suffered from simple and compound fractures of bones, or chronic exudations after other injuries, or neuralgia after amputation or resections, recovered rapidly at" Pistany. Dr. Garry suggests that at the present time, when so many are crippled or suffer intractable pain of a rheumatic or neuralgic character due to hardship or exposure in the recent war, the experiences of so eminent an authority at Pistany cannot be too widely circulated. Both the water and the mud have a natural temperature of 140° F., and both, but especially the mud, possess a high degree of radio-activity, the mud retaining this property while in use.

The "cure" consists in drinking the water and taking baths: (*a*) the basin bath of pure mineral water (mirror bath); (*b*) the basin bath with natural mud residuum; (*c*) private baths of pure mineral water; (*d*) private mud baths; (*e*) localized mud baths and poultices.

The treatment, Dr. Garry says, is efficacious in the following conditions:

> In inveterate cases of arthritis (often completely cured), chronic gout and rheumatism accompanied by pain, stiffness or thickening in the muscles and joints, after injuries to bones, tendons, or the joints, especially in the painful conditions so frequently noticed as a result of defective or imperfect union of fractures, chronic sciatica, lumbago, neuralgia, and neuritis.
>
> Chronic pelvic troubles are relieved, also the painful conditions following appendicitis or peritonitis.
>
> Pistany has obtained a reputation in the treatment of chronic spinal affections; the cases, however, which are speedily and permanently cured are that large class comprised under the various forms of paralysis of functional origin, generally associated with peripheral neuritis, and due either to toxaemia after infectious fevers, or to gout, alcohol, or metallic poisoning.
>
> Many cutaneous affections are greatly benefited. Obesity is also favourably influenced as well as the trophic disturbances associated with varicose veins. A British physician practises at Pistany during the summer months, and at the present time living for English-speaking people, owing to the rates of exchange, is very cheap and food is plentiful and good.

Pistany is three hours from Vienna, three and a half from Budapest, and one from Pressburg. The surrounding country is beautiful and of historical interest. Hale persons accompanying invalids will find facilities for fishing, boating, golf, and tennis. Persons who may think of trying Pistany this year will be well advised to obtain reliable recent information about the journey.

HONOURS.

A SPECIAL Supplement to the *London Gazette*, dated March 30th, contains the following promotions in and appointments to the civil division of the Order of the British Empire for services in connexion with the war:

M.B.E.

Tom Bland Abbott, L.S.A., Medical Services, Lotherford Hall Auxiliary Hospital, Aberford, West Yorkshire. George Reinhart Anderson, F.R.C.S., L.R.C.P., Surgeon, Southport Infirmary. James Edwin Anderton, M.R.C.S., L.R.C.P., Medical Officer, New Mills Auxiliary Hospital, Derbyshire. Bennett Harvey Andrew, M.D., Medical Officer, Thame Auxiliary Hospital, Oxfordshire. Henry Edward Annett, M.D., Medical Officer, Joint Committee Hospital, The Vicarage, Runcorn, Cheshire. Frederic Fairburn Armytage, L.R.C.P., L.R.C.S., Medical Officer, Askam Grange, Clifford Street and Nunthorpe Hall Auxiliary Hospitals, Yorkshire. John Parkinson Atkinson, M.R.C.S., L.R.C.P., Senior Medical Officer, Walden Place Hospital, Saffron Walden.

Edwin Baily, M.D., Medical Services, British Red Cross Convalescent Home for Officers, Hotel Californie, Cannes. Lieut.-Colonel Frederick Rowland Barker, M.B., Secretary, Worthing Branch, British Red Cross Society. Ernest James G. Berkly, F.R.C.S., Divisional Inspector, Southwark, British Red Cross Society; Medical Officer, Divisional Hospital. William Henry Bishop, M.B., B.S., Medical Officer, 14th Northumberland V.A.D. Hospital, Holeyn Hall, Wylam-on-Tyne. Richard Oxley Bowman, M.D., Medical Officer in charge, Fairview Auxiliary Hospital, Ulverston. Frederick Augustus L'Estrange Burges, M.R.C.S., L.R.C.P., Member of Medical War Committee, Sheffield, Ministry of National Service. Ernest Joseph Burnett, M.B., Commandant and Medical Officer of Skelton Red Cross Auxiliary Hospital. Henry Ambrose Burrowes, M.D., J.P., Medical Officer and Officer in charge, Lynn Auxiliary Hospital, Cheshire. Henry Branson Butler, F.R.C.S., Surgeon, Auxiliary Hospitals, Guildford.

William Edmund Cant, M.D., F.R.C.S., Medical Officer, Woodhouse and Great Horkesley and Gostwycke Auxiliary Hospitals, Colchester. Arthur Ernest Clarke, M.D., Medical Officer, St. Augustine's Hospital, Rickmansworth, Hertfordshire. George Cran, M.D., V.D., J.P., County Director, Kincardine Branch, British Red Cross Society; Medical Officer, Weal Auxiliary Hospital.

James Henry C. Dalton, M.D., J.P., Member of Cambridge Borough Local War Pensions Committee. George Day, F.R.C.S., Medical Officer to H.M. Cylinder Depôt, Bucknall, Ministry of Munitions. William Thomas Dempster, M.R.C.S., L.R.C.P., Commandant and Honorary Medical Officer, South Croydon Red Cross Hospital. Major Herbert Crowley Dent, Medical Officer, V.A.D. Hospital, Colne House, Cromer. John Henry Dewhurst, M.D., M.R.C.S., Medical Officer, Norton Hall Auxiliary Hospital, Gloucestershire. Alexander Dey, M.B.,

C.M., Medical Officer, 12th Northumberland V.A.D. Hospital, Fowberry Hetton, and 13th Northumberland V.A.D. Hospital, Etal Manor, Cornhill-on-Tweed. Eustace James Carey Dicks, M.D., B.S., Medical Officer, Eastor Park Hospital, Suffolk. Herbert Dobie, M.D., Principal Medical Officer, Eaton Hall Auxiliary Hospital; Medical Officer, Oakfields Auxiliary Hospital, Upton, Cheshire. Herbert Leopold Dowsing, M.R.C.S., L.R.C.P., Medical Services, St. John Voluntary Aid Hospital, Hull. Thomas Lambert Drapes, M.B., B.C., Medical Officer, Portskewett and Gwy House Auxiliary Hospital, Chepstow, Monmouthshire. Motherwell Duggan, M.R.C.S., L.R.C.P., Medical Officer, Rayner Croft and Haigh Lawn Auxiliary Hospitals, Bowdon, Cheshire, and John Leigh Officers' Hospital, Altrincham. Robert Harold W. Dunderdale, M.R.C.S., L.R.C.P., Medical Officer, Blackpool Hospital, and Secretary to Medical Board. William James Durant, M.D., Medical Officer, United Alkali Company, Limited. John Richard Haigh Dyson, L.R.C.P., L.R.C.S., Medical Officer, Honley Auxiliary Hospital, Huddersfield.

Flavell Edmunds, M.R.C.S., L.R.C.P., Medical Officer, Chesterfield Auxiliary Hospital, Derbyshire. Bogdan Edward J. Edwards, M.B., C.M., Commandant and Medical Officer, Boothroyde Auxiliary Hospital, Brighouse, West Yorkshire. Roger Bellis Edwards, M.B., B.S., Medical Officer, Leeswood Hall Auxiliary Hospital, Mold, Flintshire. Arthur Campbell Elliott, M.B., C.M., Medical Officer in Charge, Chaseside Auxiliary Hospital, St. Anne's-on-Sea. Harry Loft Evans, M.R.C.S., L.R.C.P., Member of Hull Medical War Committee, Ministry of National Service. William Owen Evans, L.R.C.P., L.R.C.S., Voluntary Medical Services to sailors and soldiers and their dependants in the Swansea Valley.

Frank Fawssett, M.B., B.S., Medical Officer, East Chiltington Hospital and St. Ann's Auxiliary Hospital, Lewes, Sussex. Edgar Hall Felton, M.R.C.S., L.R.C.P., Medical Officer, Cleethorpes Auxiliary Hospital, Lincolnshire. Bernard Gilpin Forman, M.B., Ch.B., Commandant and Medical Officer, Cober Hill Hospital, Scarborough. Alfred Wightman Forrest, M.B., C.M., Member of Sheffield Medical War Committee, Ministry of National Service. Miss Sarah Louise Fraser, M.D., B.S., Medical Officer, Nunthorpe Hall Auxiliary Hospital, York.

Henry Willoughby Gardiner, M.D., F.R.C.P., Medical Services, Quarry Place Auxiliary Hospital, Shrewsbury. Thomas Gerald Garry, M.D., Cairo Representative, St. John Ambulance Association. Captain James Albert Gibson, M.D., Medical Officer, Galcombe Auxiliary Hospital, Isle of Wight. John Cecil M. Given, M.D., Medical Officer, Holt Auxiliary Medical Hospital. Hope Wilkes Gosse, M.R.C.S., L.R.C.P., Medical Officer, Eccleshall Auxiliary Hospital, Staffordshire. Lieut.-Colonel Robert Balfour Graham, V.D., F.R.C.S., J.P., County Director, Fifeshire Branch, British Red Cross Society. George Gunn, M.D., F.R.C.S., Medical Officer, Parkgate Auxiliary Hospital, Cheshire.

Edward Marrack Hainworth, F.R.C.S., Medical Services, St. John V.A.D. Hospital, Hull. John Halliwell, M.R.C.S., L.R.C.P., Medical Officer, Winchcombe Auxiliary Hospital, Gloucestershire. Andrew Harris, F.R.C.S., L.R.C.P., Medical Officer, Red Cross Hospital, Keyford, Frome. Louis Brightwell Hayne, M.D., Medical Officer, Grove House Hospital, Harrogate. John Edridge Healey, M.B., Ch.B., Medical Officer, Moor Park Auxiliary Hospital, Preston. Captain George Brown Hillman, Medical Officer, Ledston Hall Auxiliary Hospital, Castleford, Yorkshire. Arthur Henry William Hunt, L.R.C.P., M.R.C.S., Medical Officer, Tettenhall Auxiliary Hospital, Staffordshire.

Joe Iredale, L.R.C.P., M.R.C.S., Medical Officer, Mablethorpe Auxiliary Hospital, Lincolnshire.

Daniel Noel Jackson, M.B., B.S., Medical Officer, 4th Northumberland V.A.D. Hospital, Dilston Hall, Corbridge-on-Tyne. Edward Siddall Jackson, M.D., C.M., Consulting Surgeon, Wray House Auxiliary Hospital, Wray, and Medical Officer, Bleasdale Auxiliary Hospital, Silverdale, Carnforth. Charles Saint Johnston, M.R.C.S., Medical Officer, Gloucester Red Cross Auxiliary Hospital. John Jones, L.R.C.P., D.L., J.P., Chairman, Dolgelly Sub-area War Pensions Committee; Member, North Wales (Joint) Disablement Committee. Owen Thomas Jones, L.R.C.P., M.R.C.S., Medical Officer, Barry Dock Hospital, Glamorganshire.

Charles Scott Kilner, M.B., C.M., J.P., Medical Officer, West Suffolk General Hospital and Red Cross Hospital, Northgate Street, Bury St. Edmunds. Thomas Ramsay King-Edwards, M.D., Medical Officer, Swyncombe House Auxiliary Hospital, Oxfordshire.

Major Frederic Charles Langford, M.D., M.R.C.S., Divisional Inspector, Camberwell Division, British Red Cross Society. George Johnson Langley, M.D., Medical Officer, Loversal Hall Auxiliary Hospital, Doncaster. Alexander Ledingham, M.D., County Director, Banffshire Branch, British Red Cross Society. Lieut.-Colonel John Daniel Lloyd, T.D., L.R.C.P., M.R.C.S., J.P., Medical Officer, Brynkinalt Auxiliary Hospital, Chirk.

William Neil Macall, M.D., C.M., Secretary and Medical Officer, Meols Hall Auxiliary Hospital, Churchtown, Southport. John Macdonald, M.B., C.M., J.P., Acting County Director, Fifeshire Branch, British Red Cross Society. Duncan McFadyen, M.B., J.P., County Director, Inverness-shire Branch, British Red Cross Society. Kenneth Child Mackenzie, M.D., Medical Officer, Red Cross Hospital, Caerphilly, Glamorganshire. Harold Hay Brodie MacLeod, F.R.C.S., L.R.C.P., medical services, Quarry Place Auxiliary Hospital, Shrewsbury. Henry Carter Mactier, M.B., B.Ch., Member of Wolverhampton Medical Board, Ministry of National Service. John Ogdin March, M.R.C.S., L.R.C.P., Medical Officer, Bulford Manor Hospital, Wiltshire. Herbert Harrison Marsden, M.R.C.S., L.R.C.P., Surgeon, The Cottage Hospital, Ormskirk, Lancashire. William Martin, M.B., Ch.B., J.P., Honorary Medical Superintendent, King's Road Convalescent Hospital and Railway Rest Home, Whitehead, co. Antrim. John Wright Mason, M.B., C.M., Medical Officer of Health, Hull. Walter Byron Maurice, M.R.C.S., L.R.C.P., J.P., Medical Officer, Marlborough Auxiliary Hospital, Wiltshire. Robert Mitchell, M.D., C.M., Medical Officer, Hooton Pagnell Hall Auxiliary Hospital, Doncaster. Alexander Patrick Mooney, M.D., J.P., Surgeon, St. Joseph's Auxiliary Hospital, Mount Street, Preston, Lancashire. James Murphy, F.R.C.S., Assistant County Director, Middlewich Division, Cheshire Branch, British Red Cross Society; Medical Officer, Middlewich Auxiliary Hospital and Annexe.

Arthur Edward Normington, M.B., Ch.B., Honorary Medical Officer, Reedyford Hospital, Nelson, East Lancashire.

Hugh Falconer Oldham, M.D., B.Ch., J.P., Founder and Medical Officer, St. John Auxiliary Hospital, Morecambe. John Orford, M.R.C.S., L.R.C.P., Medical Officer, Stapleton and Swillington Auxiliary Hospitals, Yorkshire. Mrs. Marie Orme, L.R.C.P., Commandant, Voluntary Aid Detachment No. 22, Derbyshire. William Fletcher Oyston, M.B., Ch.B., Medical Officer, Flounder's College Auxiliary Hospital, Ackworth, Pontefract, West Riding.

Charles O'Connor Parsons, L.R.C.P., L.R.C.S., Joint Honorary Medical Officer, Dore Auxiliary Hospital, Sheffield. John Edward Hocking Parsons, M.R.C.S., L.R.C.P., Medical Officer, Chipping Norton Auxiliary Hospital, Oxfordshire. Wallace Petherick, M.R.C.S., L.R.C.P., Medical Officer, V.A.D. Hospital, Garboldisham, Thetford, Norfolk. Joseph Henry Philpot, M.D., M.R.C.P., voluntary services in connexion with war refugees. Cecil Westland Pilcher, M.R.C.S., L.R.C.P., Medical Officer, Holden House Red Cross Hospital, Boston, Lincolnshire. James Damer Priest, M.R.C.S., Medical Officer, Royal Gunpowder Factory, Ministry of Munitions. John Skardon Prowse, M.B., B.C., Medical Officer, Basford House Auxiliary Hospital, Old Trafford.

Reginald Maurice Henry Randell, M.D., M.R.C.S., Medical Officer, Balgowan, V.A.D. Hospital, Beckenham.

Frank Reginald Sawdon, M.B., Commandant and Medical Officer, Auxiliary Hospital, Buxton, Derby. Leonard Edmund Scanlon, M.R.C.S., L.R.C.P., Medical Officer, Willow Bank Hospital, Manchester. George Edward Scholefield, M.D., C.M., Founder and Medical Officer, Aughton Auxiliary Hospital, Lancashire. Frank Scorer, M.R.C.S., L.R.C.P., Medical Officer, Crag Head Hospital, Bournemouth. Alexander Thomas Scott, M.R.C.S., L.S.A., Assistant Commander, Metropolitan Special Constabulary. Thomas James Selby, M.B., Senior Medical Officer, Auxiliary Hospital, Frodsham, Cheshire. Richard Holgate Shaw, M.R.C.S., L.R.C.P., Medical Officer, Auxiliary Military Hospital, Hampstead Garden Suburb. Thomas Frank Southam, M.D., Medical Officer, Cecil Road Auxiliary Hospital, Hale, Cheshire. Duncan Stewart, V.D., L.R.C.P., L.R.C.S., Medical Officer, Hexham V.A.D. Hospital, Northumberland. Walter Grahame Stewart, M.B., B.S., Medical Officer and Commandant, Priory Auxiliary Hospital, Ware. Robert Day Stokes, L.R.C.P., L.R.C.S., Commandant, Sidmouth Auxiliary Hospital, Devon. Charles Henry Sykes, M.R.C.S., L.R.C.P., medical services, Lotherton Hall Auxiliary Hospital, Aberford, Leeds.

William Henry Thorman, M.R.C.S., L.R.C.P., Medical Officer, Kirkburton Auxiliary Hospital, Huddersfield. Charles Augustus Thorne, L.R.C.S., L.R.C.P., J.P., Joint Honorary Medical Officer, Dore Auxiliary Hospital, Sheffield. Edward Tonge, M.B., B.S., Commandant and Medical Officer, Seaton Auxiliary Hospital, Devon.

Alfred Bertram Vine, M.B., Medical Officer, Timberhurst Hospital, Bury.

Edward Walker, M.D., Member of Huddersfield Medical War Committee, Ministry of National Service. Reginald Field Walker, M.R.C.S., L.R.C.P., Medical Officer, Esher Auxiliary Hospitals, Surrey. John Thompson Wallace, M.B., Member of Bristol Medical War Committee, Ministry of National Service. Ernest Ward, M.R.C.S., L.R.C.P., Medical Officer, Ridgelands, Church House, Popeswood and Buckhurst Auxiliary Hospitals, Berkshire. Howard Percy Ward, M.B., M.R.C.S., Medical Officer, Highfield Hall Auxiliary Hospital, Southampton. Arthur Muriel Watkins, M.R.C.S., L.R.C.P., Medical Officer, Broughall Cottage Hospital, Whitchurch, Shropshire. Edwin St. John Whitehouse, M.R.C.S., L.R.C.P., Medical Officer, "Hermitage" Auxiliary Hospital, Solihull, Warwickshire. Edward Richard Williams, M.R.C.S., L.R.C.P., Medical Officer, Carmarthen Auxiliary Hospital. Richard Williams, M.R.C.S., L.R.C.P., Medical Officer, Roseneath Auxiliary Hospital, Wrexham. Henry Chadwick Woodcock, M.R.C.S., L.R.C.P., Organizer of Red Cross work and Lecturer on First Aid in Enfield. Herbert Miall Woodhead, M.B., C.M., Medical Officer, Auxiliary Hospitals, Ingestre, Staffordshire, and Ashton-on-Mersey and Linden Lea, Cheshire.

FOREIGN DECORATION.

Honorary Colonel Sir Alexander Ogston, K.C.V.O., LL.D., R.A.M.C.(T.F.)., has been appointed a Cavalier of the Order of the Crown of Italy for distinguished services rendered during the campaign.

British Medical Journal.

SATURDAY, APRIL 17TH, 1920.

THE MECHANISM OF SYMPTOMS.

OF the various methods now employed to advance the science and art of medicine—the purely clinical, the laboratory, the combination of these two as practised in the recently established whole-time hospital units, and the epidemiological—the first is the oldest; it is also the most difficult to carry out with success, though this has only recently been suggested, and is, perhaps, not yet generally recognized. It is not easy to realize that our familiar means of dealing with a patient's complaints can be so improved and organized as to yield advances equal to, perhaps even more important than, those now regarded as the natural fruits of the clinical laboratory. But by a process of somewhat relentless logic, embodied in repeated papers, Sir James Mackenzie has awakened in us a feeling of uneasiness as to the character and efficacy of the clinical methods in ordinary hospital practice. He is, however, far from being a merely destructive critic, as is proved by his energy in establishing the St. Andrews Clinical Institute, where his methods of clinical research, carefully thought out through many years of general and consulting practice, are now in active use.

The failure in the past to obtain results commensurate with the labour devoted to the clinical investigation of symptoms is explained by Sir James as fundamental and due to the absence of sound general principles, especially of a proper conception of the mechanism of production and significance of symptoms. Such principles can only be evolved, like "the holy spirit of man," to quote from *Atalanta in Calydon*, "with travail and heavy sorrow," and in his study in symptomatology, the publication of which is concluded this week, Sir James Mackenzie emphasizes the need for a thorough educational training, and refers rather pathetically to the wasted labour of years due to the want of essential guiding principles.

Although only recently opened the St. Andrews Institute for Clinical Research is the outcome of long and careful investigation by its director, who set forth its objects in our issue of January 24th last, and now follows this up with a philosophical conception of the basis of symptoms. The effort to grasp the full significance of this thesis is not free from difficulty, for it demands not only the exercise of clear thinking, but freedom from the bias, often quite unconscious, engendered by the training and custom of a professional lifetime. In this welcome instalment of his teaching he shows that each organ when strained or exhausted produces symptoms peculiar to itself, and this is illustrated towards the end of the article by the phenomena of "the soldier's heart" and of the war neuroses. The detailed study of the reflex symptoms due to a reaction in the central nervous system or in the nervous mechanism of the organs leads on to a consideration of a somewhat neglected feature of the nervous system when under the influence of disease or other agencies—namely, its lowered resistance to stimulation. This is an all-important factor in the production of symptoms which, though referred to one or more organs, owe their appearance not so much to the local visceral condition as to a lowered threshold of the nervous system to stimuli. In various infections the general health is impaired and the organs then submitted to strain are shown by the resulting symptoms, but the underlying cause which, for successful treatment, must be combated and removed is not in these organs but in the infection.

THE LEAGUE OF RED CROSS SOCIETIES.

THE meeting of the first General Council of the League of Red Cross Societies at Geneva from March 2nd to March 8th, 1920, was briefly mentioned in our issue of March 13th. The complete proceedings of the general sessions and of the meetings of the various sections will be published in English and French during the course of the summer; but in the meanwhile the current number of the *Bulletin* of the League gives a running account of the business transacted during the week of congress and prints several of the addresses and speeches delivered at the full sessions, together with the reports presented by Sir David Henderson, Director-General of the League, and Dr. Richard P. Strong, the General Medical Director.

Twenty-seven of the thirty Red Cross Societies comprising the League were represented at the congress; delegates were sent also by the League of Nations and the International Red Cross Committee. After the opening session the council broke up into two parts—the section of organization and the medical section—which each met twice daily to ensure rapid progress in fulfilling the objects set forth in the programme. The medical section discussed the reports submitted by the various branches of the medical department of the League, and the projects brought forward by members of the General Council. The subjects included child welfare, tuberculosis, communicable diseases, nursing, medical information, sanitation, vital statistics, social hygiene, malaria, and public health laboratories. The reports relating to medical topics have been prepared in English and French, and printed copies may be had on application to the head quarters of the League at Geneva. The section of organization discussed the various phases of national Red Cross organization and peace-time activity, as outlined in a report by Mr. Frank Persons, which also may be obtained from the League.

The conclusions of the two sections were summed up in a series of resolutions, which were put into shape by a joint medical and legal committee and adopted by the Council in plenary session. The resolutions relating to medical matters will not be published until they have been discussed by the Advisory Medical Council referred to below, and by the Board of Governors, but the Director-General's report described the progress made in setting up special departments within the medical office of the League. It was thought advisable to confine the work of this department at the outset to the preparation of reports which would define the programme proposed by the League in a form suitable for discussion by the General Council. Beyond this preparations are being made for continuous communication on medical subjects with the Red Cross Societies in three different ways: The first is by means of a technical medical journal in which will appear articles of scientific medical interest on subjects in which the League is interested. "It is hoped to sustain this journal on a high level in order

that the Medical Office of the League may be reckoned as a high medical authority and its directors as experts, and also that the journal may be a medium through which recognized medical authority outside the League may be glad to make known their views and discoveries." Secondly, the *Bulletin* of the League will issue articles on medical or welfare subjects suited to popular reading. Thirdly, special bulletins will be distributed on subjects whose importance or urgency calls for immediate publication as separate pamphlets.

With regard to relief measures in Eastern Europe, it is said that the operations in Czecho-Slovakia are of the nature of general relief and present no serious administrative difficulties. In Poland, however, the problem is much more complicated and relief work is seriously hampered by the lack of preliminary necessities—food, fuel, clothing and transport. The provision of these on an adequate scale is beyond the resources of the voluntary societies. Further Government assistance is held to be necessary if the danger of an extension of the typhus epidemic is to be averted.

The Medical Director in his report sketched the organization of the medical department at head quarters for the improvement of public health and the prevention of disease. The planning of this department has largely followed the suggestions put forward at the medical conference at Cannes twelve months ago, which was attended by leading scientific authorities from England, France, the United States, Italy and Japan. The work has been split up into a number of divisions under the co-ordinating control of Dr. Strong, but the establishment of a Hygienic Laboratory and Museum has been deferred until its aims, functions, and equipment have been formulated. This is a matter obviously needing careful study before action is taken.

It has been decided that the International Medical Advisory Board shall be limited to fifteen members, not more than three representing any one country. The members will be kept in touch with the health work undertaken by the League by correspondence, and they in turn will be asked to keep the Medical Director informed of the progress of health work in their representative countries and of any important developments in the field of public health, or of any unusual opportunity for service which the League might render. It is proposed that the Medical Advisory Board shall meet at Geneva once a year, and at other times of emergency on the call of the Director-General or the Board of Governors. The first meeting will probably be held at the beginning of June next. Colonel S. Lyle Cummins, C.B., C.M.G., Professor of Pathology at the Royal Army Medical College, Sir Walter Fletcher, K.B.E., Secretary of the Medical Research Council, and Sir George Newman, K.C.B., Chief Medical Officer, Ministry of Health, have been asked to represent Great Britain on the Board.

It is worthy of note that the medical department regards the encouragement of scientific investigations in hygiene and sanitary science as a function proper to the League of Red Cross Societies, "since progress in the domain of public health depends upon the advancement of knowledge and the application of new principles." It does not, however, recommend that the League should forthwith organize an extensive laboratory force and set up a large laboratory of its own exclusively for research purposes. What the policy of the League should be in relation to research in public health and preventive medicine is submitted in the following words: "Its attitude in general should be to organize and to encourage and stimulate research work in preventive medicine and hygiene in connexion with those excellent scientific institutions already established in different countries, and also to attempt to co-ordinate national efforts in research, particularly with the idea of obtaining more uniform and correct results in medical investigations regarding which different and conflicting results have been obtained by different workers or different groups of workers in various countries. It should also, where original investigations appear advisable and of an urgent character, appoint from time to time special commissions for such researches to be prosecuted either in permanent laboratories or in the field."

VOLVULUS OF THE STOMACH.

ACCORDING to Tuffier and Jeanne,[1] a volvulus of the stomach is "an error of position of this organ consisting essentially in torsion around an axis the situation and direction of which is a little variable, but usually extends from the cardia to the pylorus." This little known condition may be complete or partial; in the latter case the pars pylorica is involved. The direction of the torsion is almost invariably from below upwards and from behind forwards. Such a movement is normal during the filling of the stomach, and volvulus is merely a gross exaggeration of what is in its inception a physiological process.

It follows from this that any condition which leads to obstruction and overfilling of the viscus is, *ipso facto*, a predisposing factor in the production of volvulus. When this accident overtakes a diseased stomach the volvulus is usually described as "complicated." But it may occur when the organ is apparently perfectly healthy, and in these circumstances Continental writers refer to the condition as "simple or idiopathic volvulus." We say "Continental writers" advisedly as the vast majority of British authors make no reference to the condition at all. In this idiopathic variety there is invariably a considerable degree of gastroptosis, a long gastro-hepatic omentum and a freely mobile stomach being essential. This is further helped by the relative approximation of cardia to pylorus which this ptosis often entails.

Niosi[2] of Pisa, in a long and reasoned contribution to this subject, adds two more cases to those which he recorded some years ago. The first was of the idiopathic type, and here the stomach of a woman, 41 years old, had twisted through 400 degrees. There was a long-standing history of dyspepsia, with attacks of pain in the left hypochondrium and a feeling of epigastric fullness, culminating in a severe attack, with vomiting of small quantities of fluid and a tense swelling beneath the left costal margin. Gastropexy and gastro-enterostomy were performed and the patient recovered. The stomach was not diseased. It is of interest to note that the early attacks of pain had led to a mistaken diagnosis of movable kidney and a belt had been provided. In the second case a woman of 42 years was seized with a violent epigastric pain and vomiting; a tense tympanitic swelling in the upper abdomen presented a great contrast to the flat, supple, lower abdomen. Niosi diagnosed a volvulus of the stomach and was fortunate in being able to pass a stomach tube and so tided her over the emergency. There was no recurrence of the acute stage, and *x* rays later showed an hour-glass stomach. Operation was eventually performed and all that remained of the

[1] *Maladies de l'estomac et de l'oesophage.* Mathieu, Sencert, Tuffier. Paris. 1913.

[2] F. Niosi, Nuovo Contributo alla Conoscenza del Volvolo dello Stomaco, *Archiv. Ital. di Chir.*, 1919, i, 275.

volvulus was a partial twist of the pyloric sac. Gastro-gastrostomy and gastro-enterostomy were carried out. Many cases of partial volvulus in hour-glass stomach are now on record.[3]

Niosi has a full discussion of the symptomatology and differential diagnosis of the condition. The most important signs are continued vomiting of very small quantities of fluid or retching only, with a resonant tense swelling in the left epigastrium, difficulty in passing the stomach tube, displacement of the heart to the left (inconstant), a subjective dragging sensation in the cervical portion of the oesophagus due to the traction of the twisted stomach, and cardiac distress. The most difficult differentiation is from diaphragmatic hernia, which Payer[4] regards as a frequent cause of volvulus itself. In the former condition dullness at the lung base and displacement of the heart to the right are important helps to diagnosis, whilst the upper abdominal swelling and flat, soft lower abdomen in contrast are very characteristic of volvulus. As for treatment, Niosi is in favour of gastro-enterostomy to prevent overfilling and to anchor the stomach. He thinks gastropexy, which suffices for Tuffier, is not enough.

UNIVERSITY OF MANCHESTER.

THE University of Manchester has issued an appeal for £500,000 to make extensions in buildings and staff which are considered absolutely necessary. All the departments, including the new Arts building recently completed, are overflowing; in some the conditions of work are described as almost impossible, and it is stated that this presses most on students of chemistry and medicine. If justice is to be done to the students and to the great opportunities for public service they represent, it is felt that expansion of the teaching staff and equipment is absolutely necessary. It was realized early last year that the university had grown so suddenly that everything must be planned upon a larger scale; subsequent developments have made the needs still greater. In the interests of medical students a large expenditure is required for the equipment and staff in the department of physiology, which are far below the actual present requirements. Increased accommodation is also needed in other scientific departments. Manchester, it is said, possesses unsurpassed opportunities for clinical study and research, which should lead to a great development of the medical school. The number of students who can be admitted to the medical school at present is restricted by the lack of space in the science departments which prepare students during the first year of their medical course. As soon as this limitation is removed the number of students will, it is believed, very greatly increase, and the school of medicine in Manchester become one of the greatest institutions in the kingdom. Not only are entirely new buildings required for at least pharmacology and pathology, but whole-time professorships of medicine, surgery, and gynaecology should be established as soon as possible. Another need produced by the great increase of students is the provision of hostel accommodation. Something has been done for women students by purchasing and equipping two houses, but further provision is needed for hostel accommodation for men. The Students' Union and refectory also are quite inadequate for the present numbers. Finally, the athletic grounds are far too small. "A university," it is said, "without proper provision for the housing and exercise of its students is not in a healthy condition." The University of Manchester, which is the senior of the four northern universities at one time grouped together, has achieved a great reputation and set a high standard in teaching and research for its degrees. We do not doubt that an immediate response will be made to the appeal, which is signed by the Chancellor (Lord Morley), by the chairman, vice-chancellor, and treasurer. Communications may be addressed to the organizing secretary, Mr. George A. Marriott, at the university.

[3] Hermes, *Deut. Zeit. f. Chir.*, 95, 1908; Reinecke, Ibid., 119, 1912; Richter, Ibid., 131, 1914.
[4] Payer, *Mittheil. a. d. Grenzgeb. d. Med. u. Chir.*, 20, 1909.

THE FUTURE OF DENTISTS' REGISTRATION.

THE Departmental Committee appointed to "inquire into the extent and gravity of the evils of dental practice by persons not qualified under the Dentists Act" presented a comprehensive report[1] in February, 1919. While the importance of making skilled dental treatment available for all needing it was insisted on, the Committee recognized that the number of dentists at present registered was insufficient. *The Dentists' Register*[2] for 1920, which has just been issued, shows that the total number of registered dentists this year is fewer by 112 than in 1919. The total of licentiates and graduates in dentistry of universities and colleges in the United Kingdom on the *Register* this year is 4,367; there are in addition 39 registered dentists holding colonial qualifications and 21 with degrees or diplomas of foreign universities. The total on the *Register* is made up of 1,030 persons placed on the *Register* at the time of the passing of the Act, as being in bona fide practice of dentistry; of these, seven hold medical or surgical qualifications and the remainder have no qualification. The Committee was of opinion that the main causes of shortage of registered dentists were two: one was the unsatisfactory state of the law, which allows the practice of dentistry by unregistered persons not qualified by a prescribed course of instruction, training, and examination; the other was the length and great expense of the minimum course of instruction and training for dental students. *The Medical and Dental Students' Register*[2] for 1920, which is just issued, shows that the number of dental students registered was 612, a large increase as compared with 1918, when the number was only 161. The largest number previously recorded was 361, in 1913. The Committee advised that the practice of dentistry by persons not registered should be prohibited, but that some of those who, without breaking the letter of the law, have engaged in practice without any qualification should be included in a register under certain conditions, one of which was that persons so registered should have been in practice for five years. In order to encourage students to pass through the curriculum for a registrable qualification the Committee recommended the establishment of a system of scholarships, the issue of increased grants to dental schools, and a reduction in the minimum time required to be spent by dental students in obtaining a qualification in dental surgery. It also recommended the establishment of a system of treatment for school children, for expectant mothers, and for children under five years of age, and the employment of dental dressers or assistants acting under the supervision of registered dentists in school and public dental services. The Committee considered that a new statutory board should be set up to administer any Act drafted on the lines of its report. The majority of the members of this new board would be dentists, but it would include a certain number of lay representatives, on the ground that as the Act would be passed for the public weal, the public should be represented upon any body formed for its administration. The General Medical Council will, if the proposals are carried into effect, retain a certain measure of control over the actions of the proposed statutory board.

[1] BRITISH MEDICAL JOURNAL, 1919, vol. i, pp. 256 and 285.
[2] Published for the General Medical Council by Constable and Co., Ltd. 3s. 4d. and 2s. 6d. respectively.

DUBLIN RADIUM INSTITUTE.

THE annual report for 1919 of the Royal Dublin Society, which controls the Dublin Radium Institute, records the issue during the year ending October 31st, 1919, of 3,215.4 millicuries (measured by its gamma ray activity) as compared with the average issue of 4,203 millicuries during the three previous years. The emanation issued during the past year included 1,295 millicuries, supplied to two military hospitals, one at Alder Hey, Liverpool, and the other at Blackrock, co. Dublin, for the treatment of orthopaedic cases. Dr. Walter C. Stevenson gives a brief report of the treatment of 123 cases at these hospitals and of 28 civilians. With two exceptions the former group were orthopaedic cases (gunshot wounds) in whom the period of convalescence seems to have been materially abridged by the course of radium treatment. "It takes months and often years of treatment to make a limb useful where the muscles are matted together by inflammation, the joints stiff and often the nerves injured as well. Radiation aids recovery by softening scar tissue and by improving the nutrition of the part, owing to its action on the blood vessels and nerves, and by its analgesic effect on painful and tender scars. Cases have occurred where a patient has been unable to use an artificial limb until the tenderness of the stump has been allayed by radiation." Of the 28 civil cases 17 were cancerous; 15 were inoperable, and radiation was applied palliatively with much success. One case, in which the growth occurred on the hand, appeared to be cured. The most striking result was obtained in a case of Hodgkin's disease, in which the glandular enlargement in the neck was causing acute pressure symptoms. No benefit was obtained in two cases of tic-douloureux. Dr. Stevenson found it impossible to get sufficient emanation to treat efficiently the less serious conditions (such as tuberculous glands, lupus, psoriasis, sinuses, and chronic ulcers) which derive benefit from radium treatment. The emanation was in constant use, being transferred from one patient to another without delay night or day; but the number of patients whom it was possible to treat was limited by the small quantity of radium possessed by the Institute.

CALCUTTA SCHOOL OF TROPICAL MEDICINE.

SATISFACTORY progress has been made both towards the completion of the buildings and with the organization of the staff for the Calcutta School of Tropical Medicine, the foundation of which is due to the enthusiasm and persistent energy of Sir Leonard Rogers. It is intended that the school shall have six departments—tropical medicine, protozoology, entomology, pathology and bacteriology, pharmacology, and biochemistry. In addition, a course will be given on serology and immunology. Attached to the school is the Institute of Hygiene, to which it is proposed to appoint a professor of hygiene and a professor of chemistry to give courses on the analysis of food, water, and drugs. During the cold weather (October to April) the institute will give a six months' course for the diploma of public health granted by the State Medical Faculty. This course is open to qualified men of any nationality, and, in addition to members of the Indian Medical Service, applications have been received from America, and the Chinese Government has reserved two places. A shorter course, lasting three months, will be given from June to September; it is designed to afford to members of the various local medical services in India an opportunity of gaining knowledge of the practical application of the higher branches of tropical research. The Governing Body of the Calcutta School of Tropical Medicine consists of members of the medical profession, and it will enjoy a large measure of autonomy. The total amount of the annual funds at its disposal will be about £11,500. Of this three Associations—the Tea Planters', the Jute Makers', and the Mine Industry's—will contribute £2,000 a year each. For the Department of Biochemistry an annual income of £2,000 a year is provided, of which the greater part is made up by gifts of £900 a year from Sir David Yule, one of the chief merchants in Calcutta, and £1,000 from Sir Dorab Tata's companies. A special endowment fund provides for four research appointments in the School of Tropical Medicine; the subjects to be immediately taken up are leprosy, ankylostomiasis, and pneumonia. The investigation into diabetes in Bengal begun by Dr. McCay, Professor of Physiology in the University of Calcutta, and his assistants, is to be continued by the Indian Research Fund Association, which will be provided with laboratory accommodation in the School. The new buildings will be formally opened, it is hoped by the Prince of Wales, in October or November next, but Sir Leonard Rogers will not be present to see the crowning of his twenty years' work for tropical medicine in India, as he has returned to this country with the intention of prosecuting his researches into the treatment of tuberculosis by preparations of unsaturated fatty acids, upon which he published a preliminary note in our issue of February 8th, 1919. The Calcutta *Statesman*, in its issue of March 3rd, published a very warm tribute to his services, especially to the practical application of his scientific researches in the treatment of cholera, kala-azar, dysentery and liver abscess, and leprosy. "We may be sure," our contemporary writes, "that he was touched and pleased by the appreciation shown by the members of his own profession, who subscribed for a bust, which now stands in the School of Tropical Medicine." Our contemporary expresses the opinion that the Government of India should not let Sir Leonard Rogers terminate his career in its service without some more conspicuous mark of its appreciation of his great services.

IMPROVEMENTS IN THE ASYLUM MEDICAL SERVICE.

IN a circular letter, dated March, 1920, and addressed to the visiting committees of all county and borough asylums, the Board of Control makes several interesting recommendations concerning the conditions of medical service in asylums. Allusion is made to the difficulty of filling vacant appointments, which is attributed to two chief causes. The first cause is said to be, that in view of the special knowledge required, "the salary is frequently inadequate to the responsibilities, and insufficient to enable a man to support a wife and family." A general increase in the salaries is recommended, and the suggestion is made that several of the senior members of the staff should be called senior assistant medical officers, receiving remuneration on a higher scale; the senior assistant medical officer (present style) should receive recognition of his status in the title of "deputy medical superintendent," and should be paid a salary more closely approximating to that of the superintendent. The second cause assigned for the dearth of applicants for staff appointments at asylums is that "permission to marry has usually to be obtained, and is not infrequently withheld on account of lack of suitable accommodation." This circumstance constitutes a very real grievance of asylum medical officers, and has on several occasions been mentioned in our columns. It is satisfactory to find that the Board of Control in its circular not only makes the general recommendation that in the case of permanent officers permission to marry be not refused, but also—what is a new departure from previous ordinance—that, subject to rules approved by the Secretary of State and with due regard to proper administration of the institution, permission may be granted to live out. Another suggested provision, which will tend to render the asylum service more attractive to many medical men, is the granting—as in the naval and other services—of study leave (with continuance of salary), during which assistant medical officers may take out one of the available special courses of instruction, and possibly prepare for a diploma or degree in mental diseases.

ATROPINE IN PYLOROSPASM AND PYLORIC HYPERTROPHY.

THE question whether congenital hypertrophic stenosis of the pylorus depends primarily on a pure developmental excess of muscle limited to the circular fibres of the pylorus, spasm subsequently supervening and so causing obstruction, or whether the hypertrophy is the result of spasm however excited, is still awaiting an answer. Dr. Pirie and Mr. Tyrrell Gray[1] suggested that the spasm was due to an excess of adrenalin in the blood, but this attractive speculation remains unproved. Just about the same time Haas[2] described the atropine treatment of pyloric spasm and stenosis based on a line of argument which is of interest in connexion with Pirie and Gray's view. Haas believes that congenital hypertrophy of the pylorus is the result of spasm, and that they are both features of what he calls the "hypertonic infant"—namely, one prone to spasm not only of the skeletal but also of the visceral muscles, as is shown clinically by colic, vomiting, visible peristalsis, and constipation. The hypertonic infant presents the symptoms of vagotonia, or over-action of that part of the autonomic system, of which the vagus is a constituent. Atropine inhibits the vagus and this part of the autonomic system, and therefore should be a rational remedy. Its use in congenital pyloric stenosis has probably failed in the past for several reasons: in the first place, it is important to use a fresh preparation of the alkaloid, as it rapidly loses its pharmacological power, and, next, to give a sufficient dose. During the previous four years, carrying out these precautions, all the cases of pylorospasm under his observation, including four on which operation had been advised, responded to treatment by atropine. The treatment was begun by giving one-thousandth of a grain of atropine by the mouth, and if no idiosyncrasy to the drug was declared the dose was rapidly increased with each feed: a common dose of atropine for an infant of a few weeks or months was $\frac{1}{50}$ to $\frac{1}{25}$ grain with an extreme of $\frac{1}{15}$ grain in the twenty-four hours, an amount he gave to an infant two weeks old. Although the explanation of the hypertonic infant and vagotonia may arouse some doubt and criticism, the results deserve notice and repetition, with attention to the use of fresh preparations and of the large doses. It would be interesting to know whether hypodermic injection of atropine acts as effectively or better. It may be pointed out that adrenalin, which increases the activity of the thoracic and not of the cephalic part of the autonomic system, does not appear to have been given to infants with pyloric spasm to see if it aggravated the symptoms; if it had been shown to have this effect, Pirie and Gray's hypothesis would be supported, and the theory of vagotonia weakened.

BRITISH MEDICAL ASSOCIATION LECTURE.

LIEUT.-COLONEL R. MCCARRISON, I.M.S., will give a British Medical Association Lecture at a meeting of the South Wales and Monmouthshire Branch at Carmarthen at 3 p.m., on Thursday, April 22nd. Colonel McCarrison intends to give a brief outline of the sources and modes of action of vitamines, and the consequences of a deficiency of these substances in the diet. He will point out the various factors which influence the production of the symptoms due to a deficiency of vitamines in general terms, but will direct special attention to the bearing of the results of his recent experiments on the genesis of intestinal disorders. These results were obtained from a long research carried out at the Pasteur Institute, Coonoor, Madras, for the Indian Research Fund Association.

JUNE MEETING AT CAMBRIDGE.

THE following provisional programme has been drawn up for the discussions in the Section of Physiology and Pharmacology at the Annual Meeting of the British Medical Association this summer. On Wednesday morning, June 30th, a discussion on acidosis in disease will be opened by the President of the Section, Professor F. Gowland Hopkins, F.R.S. On Thursday morning, July 1st, a discussion on the physiology and treatment of denervated muscle will be opened by Professor J. N. Langley, F.R.S. On Friday morning, July 2nd, a pharmacological discussion on quinine and its derivatives will be opened by Professor W. E. Dixon, F.R.S.

[1] G. R. Pirie and H. T. Gray, *Lancet*, 1919, ii. 513.
[2] S. V. Haas, *New York State Journ. Med.*, 1919, xix. 365-371.

THE Council of the British Medical Association, at the meeting of April 14th, resolved unanimously to recommend the Annual Representative Meeting that Dr. David Drummond, C.B.E., M.D., F.R.C.P., should be elected President of the Association for the year 1921–22, to take office at the Annual Meeting to be held at Newcastle-on-Tyne in 1921. Dr. Drummond is Vice-Chancellor and Professor of Medicine, University of Durham, and Consulting Physician Royal Victoria Infirmary, Newcastle. The Council decided also to accept an invitation from the Glasgow and West of Scotland Branch to hold the Annual Meeting of 1922 in Glasgow.

Medical Notes in Parliament.

The Resumed Session.

THE House of Commons, on April 12th, resumed its sittings after the Easter vacation; it has a large amount of business to get through. The Budget will be introduced on April 19th, and it may be necessary to have two Finance Bills. It is hoped that consideration of the Insurance Bill in grand committee will begin on April 22nd. Dr. Addison is also pressing forward the arrangements for the proposed legislation dealing with health matters. The draft of the Patent Medicines Bill has been passed by the Cabinet subject to settlement of certain points affecting the wine trade. The Milk Bill has been drafted; the intention is to encourage local authorities to provide a supply, but there is no desire to interfere with private trading which fulfils requirements. The Tuberculosis Bill is not yet ready, but there will be no break between the provision at present made under the Insurance Acts and that to be made under the coming measure; the reason for the delay is that the scheme will be large and comprehensive. The Census Bill has been framed; it will differ little from that of nine years ago, but one or two fresh categories may be added. Dr. Addison still hopes that he may be able to present the bill to deal with the Poor Law system and with Health Services this session, but it cannot be discussed until the autumn.

Asylums as Military Hospitals.—Mr. Shortt, in answer to Mr. Kiley on April 12th, said that the following asylums were still being utilized for the care and treatment of soldiers and pensioners suffering from neurasthenia or loss of mental balance: (1) The Oxfordshire County and City Asylum (Ashurst War Memorial); (2) the Ewell Epileptic Colony (County of London) War Hospital; (3) a block of the Middlesex County Asylum, Wandsworth (Springfield War Hospital); (4) the Lancashire County Asylum, Winwick (the Lord Derby War Hospital). The men in these hospitals who were serving soldiers were still under military control. Pensioners could not be detained against their will. The present status of the Maudsley Hospital was that of a Ministry of Pensions Hospital, but it was to be handed back to the London County Council in July next. Mr. Shortt added that he had no information as to the Maghull, Monyhull, or Craigleith institutions, to which reference was also made in the question.

St. Luke's Hospital, Bradford.—Mr. Myers asked a question, on April 12th, as to an agreement made between the Bradford Corporation and the Bradford Board of Guardians for utilizing St. Luke's Hospital as a municipal general hospital, an arrangement which would enable the Bradford Corporation to treat the sick irrespective of their economic circumstances, and avoid placing on them the stigma attached to Poor Law treatment. He asked whether the Ministry was prepared to encourage and assist the project. Dr. Addison replied that the scheme had been approved last month.

Nurses in Malta.—Lieut.-Colonel Fremantle asked, on April 12th, whether nurses sent to Malta on active service in 1915 were ineligible for the 1915 medal, while nurses serving in Alexandria under similar conditions were entitled to it; and whether there were any reasons other than those of administrative convenience why equal services in Malta should not be equally recognized. Mr. Churchill replied that service on the establishment of a unit in a theatre of war was essential to qualify for the award of the 1914–15 Star. Malta was not a theatre of war, and nurses who served there in 1915 were consequently not eligible for the star.

Correspondence.

TREATMENT OF PULMONARY TUBERCULOSIS IN PRIVATE PRACTICE.

SIR,—Pulmonary tuberculosis has increased considerably in this country during and since the war. A recent authority[1] states that 65 per cent. of the population exhibit definite evidence of tuberculous infection of the lung. To one like myself who has returned to practice in England after many years' absence, the number of tuberculous patients encountered is appalling. The condition of these cases and their families is sad and depressing—depressing to the practitioner especially, because of the utter failure of the present system of treatment either to deal effectively with existing cases or to prevent others from developing.

This decade has been called the era of *preventive* medicine, but in many parts of England preventive medicine is still unknown. Take, for instance, the construction of the dwelling house. Is it not essential that the child (born of tuberculous parents) in whom we wish to prevent the development of the disease should live in a dry, airy, healthy building, with plenty of sunlight? Where do we find such buildings? Many of the towns of Devonshire are built in narrow combes or valleys, into which the sunlight only penetrates for a few hours. The houses are dripping with moisture, moss grows on many of the walls, and a strong smell of mould pervades the tiny dwelling rooms. The windows, even if not fixed, are seldom opened. Such houses (I speak as I find them in the old fishing town of Brixham, but the description fits the poorer quarters of many towns in South Devon) could scarcely be better selected for fostering the growth of tubercle. Damp-proof courses, which in this humid climate of ours are as essential as a weather-proof roof, are practically unknown. Air bricks, or modes of ventilating the interiors independently of the open window, are absent, and sanitation is defective. What are the chances that a child, born and reared in such unhealthy surroundings, and brought in contact with tuberculous subjects, will not acquire a disease which, according to a considerable majority of authorities, is definitely communicable? Either the child should be removed from contact with its infected relations or the latter should be removed from it.

We all know that the sanatoriums are quite inadequate to deal with more than a very small proportion of the cases—namely, the early ones. The advanced and most dangerous cases remain at home to infect the children. The early cases are given a certain time at the sanatorium and then discharged; about two-thirds of these cases relapse and become eventually "advanced cases." It is these cases especially that the private practitioner has to treat in most unfavourable surroundings. His treatment for the most part becomes the treatment of symptoms; it does not strike at the root of the disease, but it makes the remaining life of the patient more comfortable. It is eminently unsatisfying to the keen practitioner, who often feels uncertain as to the efficacy of his remedies, and yet has no research treatment institution to apply to in order that they may be tested.

Treatment, which is the only thing the patient cares about, has been much more neglected than any other branches of medical knowledge. The profession is too apt to imagine that it must thoroughly understand the pathology of a disease before it can begin its treatment; meanwhile patients are dying of the disease. Many of our most potent remedies have been discovered by experiment, trial, or intelligent thought—quite apart from a knowledge of the pathology of the disease. If more time were spent on therapeutic research, the general practitioner would be enabled to deal more efficiently with diseased conditions.

What can the general practitioner do against such a mountain of difficulty? He can only work and pray—pray that the people may become more enlightened and co-operate; pray that the Ministry of Health will come to his rescue and help in the sanitation of his town, and that the country will build proper houses in proper situations, and let the air and sunlight into the alleys. He must pray also that the proper authority will build hospitals or open wards for advanced and infective cases and remove them from contact with the young, and that the Government will not only sanction but press forward the foundation of a research treatment institution, which shall test remedies submitted to it and issue authoritative reports thereon.—I am, etc.,

W. SIDNEY SWEET, B.Sc., M.D., B.S.Lond.,
Bachelor of Civil Engineering; late Chief Resident Medical Officer of the Perth Public Hospital and Subiaco Sanatorium, Western Australia.
Brixham, March 31st.

[1] Dr. Thomas Beattie, BRITISH MEDICAL JOURNAL, January 24th, 1920

VILLAGE TUBERCULOSIS SETTLEMENTS.

SIR,—In your report of the interview between Dr. Addison and the deputation headed by Sir Montague Barlow, M.P., I notice that "the case for the establishment of village settlements" was put forward on two grounds—namely:

Firstly, *the patient* should be in a position to look forward to being able, on completion of his course of treatment and training, to take up his permanent residence in a settlement where, still in close touch with the sanatorium, he could work under conditions which would enable him to maintain his health and have his family or dependants with him.

Secondly, *the community* would gain in the result by the prevention of the spread of infection and the fact that the tuberculosis patient would remain a productive worker.

These two objects seem on the face of them highly desirable and most ideal if they are not incompatible.

As illustrating the results of establishing a village settlement on these lines it was stated that at the Cambridgeshire Tuberculosis Colony, out of thirty cases who had passed from sanatorium treatment and training into the settlement there, not one had died in four years.

How many of these were cases in which the tubercle bacillus was found? Dr. Bardswell has recently shown that of 1,390 persons with tubercle bacilli present in the sputum who applied to the London Insurance Committee in 1914 for sanatorium benefit, 997, or 71.7 per cent., were dead in December, 1918, while some observations (unpublished) of my own in North Kensington showed a similar result, and even suggested that, with a certain proportion of exceptions, those in whose sputum tubercle bacilli were found in large numbers seldom lived much longer than six to twelve months after this discovery. Nor are the lives of cases with tubercle bacilli greatly lengthened by even the most efficient sanatorium treatment. Dr. Bardswell himself, one of the greatest advocates of sanatorium treatment in this country, practically acknowledges in his report that they are not, and the paragraph preceding Table IV in his report is merely an elaborate paraphrase of this opinion.

A very large proportion of the cases discharged from our sanatoriums as "arrested" or "cured," and who are alive five years later, are cases in whose sputum tubercle bacilli have never been found, and a certain proportion of these are undoubtedly cases in which the diagnosis of tuberculosis was wrong in the first place.

It seems to me that these are the cases which will inevitably fill the village settlements. And, if so, it is a puzzle to see how the community will benefit by "the prevention of the spread of infection." Already one of the new colonies demands a negative bacteriological report on the sputum by the tuberculosis officer who signs the application form.

These colonies and settlements are going to cost an enormous amount of money, and it would be interesting to know how many tuberculosis officers have been consulted as to their practicability and value. That there is a limited number of men patients (with tubercle bacilli in their sputum) who would appreciate the opportunities offered and who could and would benefit thereby is undoubted. But that their number will prove comparatively infinitesimal I feel assured. Meanwhile what seems to me the most urgent necessity of the antituberculosis campaign—what I believe every practical tuberculosis officer in the country most desires—is the provision of increased and improved accommodation (free from all stigma of pauperism) for the isolation of the far advanced and also of the less advanced but chronic ambulant cases with tubercle bacilli in their sputum (who are together, I believe, the source of nine-tenths of the infective material). This takes a secondary place and appears to be in danger of being indefinitely postponed "for want of funds."

If only these cases with tubercle bacilli could be isolated more effectively and a milk supply free from tuberculous contamination be attained, it is my firm belief that tuberculosis could be almost eradicated in one generation. This object will never be achieved, in my opinion, by any further attempts (costly as they are) to bolster up our present defective means of treatment and prolong the lives of a few isolated cases.—I am, etc.,

D. J. WILLIAMSON,
April 6th. Chief Tuberculosis Officer, Portsmouth.

THE ILEO-CAECAL VALVE.

SIR,—In the BRITISH MEDICAL JOURNAL of August 9th, 1919, Mr. Short reports a case in which he had the ileo-caecal valve under observation. There is an important difference in this case to the one I reported in 1914 (*Ileo-caecal Valve*, Lewis). In Mr. Short's case there is a "prolapse of the bowel about the size of an orange," . . . "in the centre of the protuberant mass the ileo-caecal valve is plainly visible all the time."

In the case mentioned by me in 1914 the ileo-caecal valve was not prolapsed, and could only be observed when peristalsis was active. When seen the ileo-caecal valve resembled half a red cherry, with a dimple in the centre, from which five radiating corrugations ran out for about 6 mm. It was in tonic contraction and circular. When peristalsis was sluggish the papilla remained hidden under the folds of mucous membrane, and fluid faeces welled up from the colon and caput caecum coli. But faeces were passing through the ileo-caecal value all the time.

In the case described by Mr. Short the ileo-caecal valve was oval in shape, and faecal matter only voided when food was taken by the mouth; also the ileo-caecal valve was insensitive to touch. These differences may be due to the fact that in the case reported by Mr. Short there was a prolapse of a mass of caecum and ileo-caecal valve. The pulling of the mesentery of the small bowel is probably responsible for the oval shape of the ileo-caecal valve in his case, because he says even "when the sphincter is contracted it [the slit-like orifice] is about three-quarters of an inch long." . . . "It grips the inserted finger."

A circular muscle in a state of contraction, as the above evidently was, must assume a circular shape unless other forces are brought to bear. The pylorus is circular, also the internal anal sphincter. In the case described by the writer in 1914 the ileo-caecal valve was free to move and was always circular, even when relaxed in the discharge of semi-fluid faecal matter. It is inconceivable that a sphincter should be otherwise than circular when free to move and in tonic contraction.

In spite of the above references, the case reported by Mr. Short corroborates in a marked degree the case the writer reported in 1914, to which Mr. Short kindly refers.

The time to observe the ileo-caecal valve is within a very few hours after death, when it will be found as a circular mass, in tonic contraction, about 1.8 cm. in diameter, with a dimple in the middle. Soon after death the muscular fibres of the valve relax and the orifice becomes a slit. Later there is complete relaxation of the muscular fibres, with the familiar slit-like orifice of the dissecting room.

In your issue of August 16th Professor Keith claims to be the first to announce, in the *Proceedings* of the Anatomical Society, November, 1903, "that the ileo-caecal orifice is guarded by a sphincter in man and in all other vertebrate animals." Professor Keith is evidently not aware that this same statement was made in 1877 by Bureau in his *Thèse de Paris*, quoted by Poirier and Charpy 1901, p. 329, Tome IV. In regard to the evidence brought forward by Professor Keith in 1903: In his anatomical evidence he states that (1) the longitudinal fibres common to the bowel do not enter into the ileo-caecal valve; (2) that the muscular fibres surrounding the orifice form a series of racket-shaped loops, which, springing from the posterior frenulum, encircle the anterior angle of the orifice and return to end in the posterior frenulum. The posterior frenulum is the basis from which these fibres act.

Keith describes the closure of the valve as due to the pulling of the handle of the racket, aided by the fibres surrounding the orifice. In the microscopical evidence submitted by the writer in 1914 it is shown that (1) the longitudinal fibres common to the small and large bowel passed at the top of the valve between the circular fibres; (2) that thick bands of circular muscular fibres surround the orifice of the ileo-caecal valve. If the writer's interpretation of the microscopical section published in 1914 as frontispiece to his book is correct, there is a special circular bundle of fibres in the ileo-caecal valve over and above the circular bundles continuous of those from the small and large intestine.

Now, Bureau in 1877, Professor Keith and Professor Elliott in 1903, stated there was a muscular sphincter at the ileo-caecal orifice. Not one of them, however, has brought forward sufficient proof that is necessary to establish such an important fact. By proof necessary the writer means anatomical and microscopical evidence. To obtain this it is necessary, first, to study the ileo-caecal valve *in situ*, as described by the writer in 1914, not prolapsed, as Mr. Short's case; secondly, to use only specimens secured immediately after death. From Professor Keith's anatomical description it appears he did not do this, or he would have described a sphincter with longitudinal muscular bundles running between the circular to the summit of the valve. This sphincter would have been strong enough to act without the aid of the handle of the racket he mentions, formed by muscular bundles in the right frenulum. He says "the posterior frenulum is the basis from which these fibres act."

Mr. Short reports and figures the ileo-caecal valve as oval. Now the writer must emphatically state that the normal valve is circular, not oval. This is true not only in man, but also in the dog, as has been already mentioned in his book in 1914.—I am, etc.,

Sydney, Dec. 2nd, 1919. A. H. RUTHERFORD.

THE DIAGNOSIS OF DISEASE OF THE PANCREAS.

SIR,—I have read with very great interest the Schorstein Lecture by Sir Archibald Garrod published in your issue of April 3rd.

He refers to Loewi's adrenalin mydriasis test. The dilatation of the pupil that follows the application of a few drops of 1 in 1,000 adrenalin solution to the conjunctiva is, as he explains, due to excessive irritability of the true sympathetic, as the result of the removal of the restraining influence of the pancreas. He mentions a few of the pitfalls in connexion with the test, but has omitted the fact that in some individuals there is normally a predominating action of the sympathetic — the so-called sympathicotonic group of Eppinger and Hess. Such individuals would respond to the adrenalin test even in the absence of any pancreatic mischief. Possibly those cases in which Sir Archibald Garrod obtained a positive result without there having been any gross lesion of the gland may have belonged to this group. It is difficult to see how altogether to exclude this error unless the normal response of the patient to vagotropic or sympathicotropic drugs, before the onset of the suspected pancreatic disease, is known. In patients who are known to be vagotonic a positive Loewi's test should be of extremely great value.

It would also be interesting to know from Sir Archibald Garrod whether he tried the effect of pancreas feeding on the adrenalin mydriasis test. Should the administration of pancreas gland result in giving a negative Loewi's test in a case in which the test was at first positive, the evidence in favour of pancreatic disease should be practically conclusive.

I wish to suggest one or two other tests which are based upon the same physiological principle, and would therefore be subject to the same reservations as Loewi's test. The advantage of the following tests over Loewi's is their rapidity, the response occurring within a few seconds instead of about an hour, as well as the fact that they can be utilized even in cases of irides fixed by synechiae. Loewi's test is also, for obvious reasons, not suitable in cases of glaucoma. The tests I suggest are the following:

(*a*) *Aschner's Oculo-cardiac Reflex.*—This test consists in observing the effect upon the pulse of compressing the eyeball with the thumb. In vagotonics (and, indeed, in my own limited experience, in most people) a retardation of the pulse by about ten beats per minute is noticed within a very few seconds. In known sympathicotonics there is either no retardation or there is an actual acceleration of the pulse. If, therefore, the response in a case of

suspected disease of the pancreas is sympathicotonic in type, especially in a case previously known to be vagotonic, there should be strong presumptive evidence in favour of disease of the gland.

(*b*) *The Respiratory-cardiac Reflex.*—Vagotonics, as well as those who have some septic focus about them such as furunculosis or rheumatism, show, on taking a deep breath, a retardation in pulse frequency as well as a diminution in the volume of the pulse as shown by the sphygmograph (Wilson and Carroll). It may therefore be expected that in disease of the pancreas this reflex would be either diminished or abolished.—I am, etc.,

London, W., April 5th. W. M. FELDMAN.

THE TREATMENT OF UTERINE CANCER.

SIR,—Your leading article has had a curious effect on Dr. A. Leitch, who says he is sad, but shows no signs of it in his letter published on April 10th, p. 521, which reminds me of the author of *Alice in Wonderland*. He has proved that my three cases of cure of cancer were due to luck by asserting it three distinct times. As for poor old Leonides, who had the temerity to live and operate eighteen hundred years ago, "off with his head"; it is evidently the only kind of amputation of the cervix Dr. A. Leitch believes in. "Curiouser and curiouser" is his knowledge of that old fellow's mortality statistics. Curiousest of all—and here the Cheshire cat would have enlarged its smile—is his opinion that only 3 per cent. of cases of cancer of the cervix can be cured by amputation, because only 3 per cent. of cases dead of the disease show no extension beyond the uterus. Sad? No, Sir, the writer (like the reader) of his letter must be a merry fellow.—I am, etc.,

London, W., April 10th. HERBERT R. SPENCER.

FIBROIDS COMPLICATING PREGNANCY: HYSTERECTOMY: RECOVERY.

SIR,—Mr. Stawell (April 10th, p. 498) omits to give the date of the operation in his interesting case. I cannot suppress a hope that it occurred previously to the publication of my Lettsomian lecture on the subject, which he quotes. For one of the chief reasons for that lecture was to show that infanticidal hysterectomy is rarely necessary. Judging from the particulars given of Mr. Stawell's case, in which an enema removed the only symptoms from which the patient suffered, I think it highly probable that pregnancy might have been allowed to progress until the child was viable, when Caesarean section, followed by total abdominal hysterectomy (and the removal of the dermoid tumour at the same time), would, I doubt not, in Mr. Stawell's hands have caused the patient to rejoice at getting completely rid of her neoplasms and at having a living child.—I am, etc.,

London, W., April 10th. HERBERT R. SPENCER.

THE MENTALLY DEFECTIVE.

SIR,—It was with pleasure I read the article on the Birmingham scheme, by Dr. W. A. Potts in your issue of April 3rd, 1920, p. 472. Anyone who has had much experience of prisons, more particularly of prisoners, must feel that an educative policy should be vigorously prosecuted, preparatory to legislative reform in our penal systems. Not only the laymen and medical men, but even the medical staffs of asylums, require education in this direction. Medical officers of asylums and of institutions for the mentally defective have excellent opportunities of gaining valuable information concerning the lower grades of mental deficiency; but the prison medical officers have much better opportunities of observing the higher types.

In all my experience among inebriates I have never yet seen one who did not present evidence of mental defect. It is quite true, I admit, that in some cases—in fact in the majority—the defect is of the higher grade, while in a relatively small number it is not manifested till the patient has been some considerable time under observation and treatment in the institution.

Mental deficiency is a more complex disorder and is a more difficult subject to investigate and study than what we call "insanity." No one will dispute that there are many cases of either disorder which can be recognized as soon as they come before the examiners. There are, however, certain types of insanity which cannot be certified till seen several times; and a proportion of cases, though undoubtedly insane, cannot be certified at all.

Many of the higher grades of mental deficiency require prolonged study before correct diagnosis can be made. These are the cases which are the gravest danger to society, because they can carry out schemes of cunning which the average medical man would not credit. I have had prolonged conversations with the acknowledged premier criminal in Scotland. Very few medical men would admit he was a higher grade defective from anything seen or elicited; but that a man fails to unmask signs and symptoms is no proof that they are absent.

Let me conclude by saying that the specialist should have training and experience so as to be considered as such before his appointment to the highly important position as medical officer of a large prison. This may be one of the advantages—perhaps the only one—of having criminal lunatics in a special department of a prison; and in Scotland, where this has been in force for many years, this expert opinion has been freely used by the courts in the case of untried prisoners.—I am, etc.,

H. FERGUSON WATSON, M.D.,
Edinburgh, April 5th. D.P.H., L.R.C.P.

THE INDIAN MEDICAL SERVICE.

SIR,—I enclose a cutting received from *The Pioneer*. The information it contains, emanating from the Director-General of the I.M.S., and the confidant of the Government of India, is of such a nature as to deserve the most careful attention of all who think of entering the I.M.S. and of all who are responsible for guiding them in their choice.

I shall not, for the moment, offer any further comment on it.—I am, etc.,

R. H. ELLIOT, Lieut.-Colonel I.M.S. (ret.).

*** The cutting enclosed by Colonel Elliot is from *The Pioneer* of March 11th, 1920, and is a portion of the report of a speech by the Director-General I.M.S. in the Viceroy's Legislative Council:

"General Edwards in conclusion referred to the Indian Medical Service, which, until recent years, did not contain more than 7 per cent. of Indians. The Secretary of State decided not long ago that one-third of the new recruits should be Indians, and the latest private information was that this number might still further be increased. More than this there was a proposal that in order to facilitate the entry of Indians scholarships or nominations should be given to the most promising Indian students who wished to enter the service. In the former case they would proceed to England to complete their curriculum and then compete for the Indian Medical Service. In the latter case they would proceed to England for a further course of instruction only. Indians should no longer regard this service as one in which they had no interest. For the first time India was beginning to control her destinies. It was at such a crisis in the history of the nation that they may look for the birth of men great in the highest sense of the word. He earnestly desired that Indians should come to the front in the medical and scientific world. The Indian Medical Service had been a great asset to India in the past, and attracted her best intellects from the British medical schools. Let it now attract the best from the schools of India."

RARE ACCIDENTS PRESUMED DUE TO NEGLIGENCE.

SIR,—In the Court of King's Bench on March 24th, 1920, in the course of his judgement in an action for damages brought against a dental surgeon, Mr. Justice Bailhache laid down a principle of great importance and wide application. As it seems to be unsound, both in law and logic, it ought not to pass unchallenged, especially as the fallacy of it is not readily apparent to most people. Mr. Justice Bailhache said:

One must remember that an operation of this kind, with this carborundum wheel, is a very common, and indeed I should suppose, an everyday dental operation. One asks one's self whether that operation is attended commonly, or even rarely, with any danger of injury to the tongue or mouth. The very competent witnesses who have been called for the defendant have all said that in their own experience with such a wheel as this they have never heard of such an accident, or such an incident as happened in this particular case. They have not heard of it, nor, according to one of the witnesses, can such an instance be found in the textbooks on the subject. One starts with this, therefore: here is a very common operation practically never producing any detrimental results, and never producing any injury to the mouth, but on this particular

occasion inflicting a severe wound in the floor of the mouth. It seems to me, under those circumstances, it lies upon the dentist who was conducting the operation to give some satisfactory explanation to the court as to why, in this particular instance, the unexpected happened; why it was that in this particular instance an operation of this kind resulted in an injury which nobody has ever before heard of in connexion with this particular operation.

Later on this point of view is emphasized, and the judge says:

Of course, if this were an injury that often happened one would come to a different conclusion; but it is an injury, as I say, which nobody has ever heard of in practice before.

This last statement of the judge, as I can myself testify, although somewhat supported by the evidence in the case referred to, is quite inaccurate. The accident does occur from time to time. The principle of the decision is, however, what concerns us most. The decision amounts to this: "Where an extremely rare accident occurs in a very common operation, the onus falls on the defendant of proving that he was not guilty of negligence which will otherwise be assumed." From the legal point of view it ought not to be presumed that a man is guilty solely because he cannot prove his innocence. The accident referred to by the judge happened in so short a space of time and under such circumstances as to make it impossible to do more than guess at the causes of it. There was not a particle of evidence of any negligence of which anyone present at the operation was aware. The defendant was found to have been negligent because he could not bring any evidence beyond his own statement on oath that he had not been negligent. The fact that the accident had occurred was regarded as in itself establishing negligence unless some cause for the accident was established inconsistent with the presumption of negligence.

It is hardly necessary to explain to surgeons that in the performance of many operations the most skilful and careful operators will from time to time cause accidental injury to a patient. In some cases these accidents are very rare and in others not uncommon. In abdominal operations, for instance, with all care and skill an operator occasionally makes an opening into the intestine unintentionally. If improved methods make a particular accident very rare, does that make it an indication of carelessness although when more common it did not indicate negligence? Even the rarest of unavoidable accidents will usually be found to occur with a wonderful regularity if a large enough experience is available, and the mathematical principles of the theory of chances will apply. Accidents due to negligence, on the other hand, will multiply or diminish according to the presence or absence of conditions conducing to negligence, and will therefore be liable to considerable fluctuations in frequency. There are, of course, accidents which by their very nature indicate negligence. If a barber in shaving a customer cuts the carotid artery, negligence might be assumed in the absence of evidence to the contrary, but not because the accident is "practically unknown." As regards the particular accident which gave rise to the legal proceedings referred to above, I remember an instance of its occurrence in which it was, in my opinion, due to negligence because there was evidence of negligence. When there is no evidence of negligence, it is quite wrong to assume negligence because the accident is rare. Any competent dental operator knows that this particular accident may happen without any negligence or want of skill whatever. As Mr. Hopson said in his evidence, the accident had never happened to him, but he attributed that fact to good luck. In other words, an accident which happens on an average once in 100,000 cases may befall one operator and not another without any difference in care or skill between them.—I am, etc.,

32, Craven Street, Strand, W.C.2, April 1st. HUGH WOODS, M.D.

NYCTALOPIA OR HEMERALOPIA.

SIR,—With reference to your remarks (April 10th, p. 514) regarding the double use of the term "nyctalopia," the uncertainty as to its meaning arose long before the Middle Ages. St. Isidore of Seville (d. A.D. 636) says in his *Etymol.*, Bk. IV, *De Medicina*, cap. 8: "Nyctalmus is a disease in which those suffering from it lose their sight by day and regain it as night approaches; or vice versa, as many say, they can see by day and are blind at night." This statement Isidore may have taken directly from the Isagoge, attributed to Galen, cap. 16: "Nyctalopes are those whose sight is dim during the daytime, who see better as the sun declines, but see best at night; or the reverse, they see not too well by day and not at all in the evening." In the Medical Definitions (No. 343) of Galen, if they are his, nyctalops is an affection of the eyes in which, without apparent cause, the patient cannot see by day but is able to do so at night. This agrees with the opinion usually ascribed to Hippocrates, his great authority. Theodorus Priscianus (*Euph.*, 12, 39) uses the term in the same sense. Nyctalopia, "the night eye," may be compared with nycticorax, which Isidore (*Etymol.*, 12, 7, 41), on the authority of St. Jerome, describes as the night bird which loves the night and avoids the day, because it cannot see in the sunlight.

On the other hand, the weight of evidence is in favour of nyctalopia as "night blindness." It is used in that sense by Aristotle, Pliny, Celsus, Aetius, Oribasius, Alexander and Paul.

Nor was the ambiguity of meaning confined to the Greek word. The early Latin term was luscitio: "luciosos . . . nyctalopas a Graecis dictos" (Pliny, *N. H.*, 28, 11, 47, 170). Paulus ex Festo (that is probably Verrius Flaccus, 1st century B.C.) "luscitio vitium oculorum quod clarius vesperi quam meridie cernit"; but on the other hand, Varro, the contemporary of Verrius, "vesperi non videre quos appellant lusciosos" (Varro apud Non, 135, 12). Vegetius calls the disease "lunaticus oculus."

According to Hippocrates (*Pror.*) and Aristotle (*De Gen. An.*, 5, 1), the disease is more apt to attack young persons and, adds the latter writer, those who have dark eyes. For, says Aristotle, there is more fluid in dark eyes and also in the eyes of the young because their brain is more fluid. This excess of fluid interferes with the transparency of their eyes so they see less well in the twilight, as the light is then weak.—I am, etc.,

London, S.W., April 10th. RORY FLETCHER.

WAR HONOURS.

SIR,—In several recent numbers of the JOURNAL there have appeared letters by civil surgeons complaining that there is no issue to them of war medals or other simple recognition of services rendered by civilian doctors in connexion with the war.

The following paragraph, which has appeared in the *Cape Times*, will be read, therefore, with both interest and surprise by English medical men:

As a result of strong representations made by the Union Government to the Imperial authorities, the grant of the British war medal has now been extended to South African troops who were employed for a period of not less than thirty days between August 4th, 1914, and November 11th, 1918, within the Union of South Africa on coast defence, or other military duties directly connected with the war; also to European civilians employed on the staffs of the South African military hospitals, or as a member of recognized organizations who actually handled sick and wounded soldiers and who served forty-eight hours a week for not less than fifty-two weeks, whether continuously or not.

Surely it is not too much to suggest that what can be done for lay persons who have rendered services—often of a very minor kind—out here and at this distance from the seat of war should also be done for the many civilian doctors who—often under great personal difficulties, strain, and self-sacrifice—put in hard professional work in the treatment of wounded and sick soldiers.

I was myself a whole-time civil member of the medical staff of a large war hospital in England for two years, and therefore had a good opportunity of seeing the greatness of the work done by civil doctors, for which the pecuniary remuneration allowed by the War Office was a mere bagatelle—less, indeed, than the pay of many a girl munition worker.

Perhaps the British Medical Association may see its way to move in this matter—with a little real spirit.

Although I do not personally seek any such recognition I prefer not to subscribe my name.—I am, etc.,

Cape Town, March 26th. ONE WHO WAS OVER AGE.

TAXATION OF MOTORS.

SIR,—In the various press reports forecasting provisions in the forthcoming Budget and predicting an increased tax on motor cars estimated at 15s. or 20s. per horse-power,

I have failed to observe any mention of relief to medical men. The medical profession surely should not be classed with those who use cars as a luxury or simply as a personal convenience.

It is to be hoped that our interests are being looked to in the House of Commons.—I am, etc.,

Harrogate, April 10th. R. RAINES.

Obituary.

G. A. WRIGHT, F.R.C.S.,

Consulting Surgeon Royal Infirmary, Manchester.

THE death in retirement of Mr. G. A. Wright has caused much regret to old students of the Manchester School of Medicine. George Arthur Wright, who was in his 69th year, was a son of the rector of Vange, Essex, and was educated at Marlborough and Oxford, and afterwards at Guy's Hospital. He graduated M.B.Oxford in 1877, and became M.R.C.S. in the same year. He took the F.R.C.S. in 1878, and held the appointments of house-surgeon and surgical registrar to Guy's Hospital. His connexion with Manchester began when in 1880 he became resident surgical officer at the Royal Infirmary; two years later he was appointed honorary assistant surgeon to the infirmary and surgeon to the Pendlebury Children's Hospital. This latter appointment and the fact that he did not become full surgeon to the Royal Infirmary for eighteen years probably account for the fact that his greatest interest was in the surgery of childhood. His first publication was a book on hip diseases in childhood, published in 1887, but the work by which his name is best known to the profession generally is that on *The Diseases of Children*, which he wrote in conjunction with the late Dr. Henry Ashby; it was published in 1889, and was founded on the experience of the authors during the previous ten years at the General Hospital for Sick Children, Pendlebury, Manchester. The book was both learned and practical, and immediately took its place as at that time by far the most comprehensive work on the subject. A fifth edition was published in 1905. Wright put his best work into the book. He was a pioneer in the treatment of tuberculous disease of bone and of the spine, and one of the first to treat spinal abscesses by evacuation without drainage—a method which he described to the American Orthopaedic Association in 1891. He was a bold but careful operator, with a profound knowledge of anatomy; in 1902 he published a *Handbook of Surgical Applied Anatomy*, written in conjunction with Mr. C. H. Preston; it reached a second edition in 1904. He was for some time lecturer on operative and practical surgery in the University of Manchester, and on the death of Professor Tom Jones in South Africa in 1900, succeeded him as professor of surgery. When he retired in 1911 under the age rules, he was appointed Emeritus professor.

Mr. Wright was a member of the Council of the Royal College of Surgeons of England from 1906 to 1910. He was secretary of the Section of Surgery at the Annual Meeting of the British Medical Association at Bristol in 1894, vice-president of the same section at Manchester in 1902, and president at Exeter in 1907. He was a lieutenant-colonel R.A.M.C. and administrator of the 2nd Western General Hospital T.F. He had retired before the war, but returned to work and was attached first to the Red Cross Auxiliary Hospital at Worsley Hall and afterwards to the Military Hospital at Whalley.

Mr. Wright was greatly esteemed by the profession in Manchester and many miles around. He was at various times president of the Manchester Pathological and Medical Societies. As a clinical teacher he was most successful and the warm interest he took in all matters affecting the welfare of the students of the school won their respect and affection.

JOHN ALFRED CODD, M.D., B.Sc.LOND.,

Physician, Wolverhampton General Hospital.

WE regret to record the death, which took place suddenly on March 3rd, at the age of 51, of Dr. J. A. Codd, of Wolverhampton. A son of the late Rev. John Codd, of that city, John Alfred Codd was educated at Leeds, and graduated B.Sc.Lond. in 1886, M.B. in 1891, and M.D. in 1896. After holding the posts of assistant demonstrator of anatomy in the Yorkshire College and house-physician at Leeds General Infirmary, he went to Wolverhampton in 1893 as house-physician to the General Hospital, subsequently becoming honorary physician, and physician to the ear, nose, and throat, electro-therapeutic and radiographic departments. For many years he served as M.O.H. of Heath Town.

Dr. Codd had an extensive consulting practice in Wolverhampton and district, and made a number of useful contributions to medical periodical literature, notably "The dosage of tuberculin," "Treatment of malignant disease by *x* rays," and "Angeioneurotic oedema cured by adrenalin," published in this JOURNAL. He was also the author of "The utility of intubation of the larynx" and other short monographs. He was prominently associated with local social and religious organizations, and took a keen interest in many non-medical branches of science, notably conchology. He was president of the South Staffordshire Naturalists' Society.

Dr. Codd rendered many valuable services to the British Medical Association. He was from 1903 to 1910 honorary secretary, and in 1915 chairman, of the South Staffordshire Division. In 1910 he was elected president of the Staffordshire Branch, and in the following year he served as vice-president of the Electro-Therapeutic Section at the annual meeting of the Association at Birmingham. He was president of the Midland Branch of the Society of Medical Officers of Health. He was appointed by the Insurance Commissioners a member of the Wolverhampton Insurance Committee in 1912, and was a very regular attendant at its meetings. His death is mourned, not only by a large circle of patients, colleagues, and friends, but also by the many charitable and scientific associations for whom he worked with such conspicuous zeal and devotion.

The Services.

DEATHS IN THE SERVICES.

SURGEON LIEUTENANT PETER BURROWES KELLY, D.S.O., late R.N., died at Crookstown House, Ballytore, county Kildare, on April 6th, aged 31. He was educated at the Cecilia Street Hospital, Dublin, and at St. Bartholomew's and Charing Cross Hospitals. He took the Irish double qualification in 1911, and the day after war was declared, August 5th, 1914, entered the navy as a temporary surgeon. He served in the Dardanelles in 1915, taking part in the landing of the expeditionary force, when he was wounded, mentioned in dispatches, and received the D.S.O. The last post he held, before he was demobilized in April, 1919, was that of medical officer to the Royal Naval College at Osborne, Isle of Wight.

Major Thomas Henry Balfour, M.C., R.A.M.C., died at Quetta on March 16th. He was the youngest son of the late Dr. Andrew Balfour, of Portobello, and graduated M.B. and Ch.B.Edin. in 1909, taking the D.P.H. of the Scottish Colleges in 1911. He entered the R.A.M.C. in 1912, was promoted captain on March 30th, 1915, and to acting Major on February 25th, 1918. Before going to India he had served for most of the war in France, first with the 2nd Battalion Argyll and Sutherland Highlanders, and then as D.A.D.M.S. with the 12th Division and 15th Corps. He received the Military Cross on February 18th, 1915.

Colonel Douglas ffrench-Mullen, Bengal Medical Service (retired), died on April 2nd, aged 68. He was educated at Queen's College, Galway, and Steevens's Hospital, Dublin, and graduated M.D. Queen's University, Ireland in 1873. He entered the I.M.S. in 1877, and attained the rank of full colonel in 1907, and retired in 1912. Most of his service was spent in political employment, as medical officer of various states in Rajputana; latterly he held the post of D.D.M.S. at Simla. He was joint author, with Lieut.-Colonel P. D. Pank, I.M.S., of *A Medico-topographical Account of Ajmere*, 1900. Colonel-ffrench-Mullen was the third of four brothers, all of whom entered the public medical services. The eldest was in the navy, and after his retirement stood unsuccessfully for South Dublin as a Parnellite in 1892. The second, the late Lieut.-Colonel Thomas ffrench-Mullen, entered the I.M.S. in 1866, retired in 1896, and died on October 12th, 1896. The fourth, Lieut.-Colonel Jarlath ffrench-Mullen served in the Colonial Medical Service in Jamaica from 1874–76, in the R.A.M.C. for six months in 1877–78, and in the I.M.S. from 1878 to 1908, and still survives.

Brigade Surgeon Lieut.-Colonel Joseph Forbes Keith, Bombay Medical Service, retired, died on April 1st, aged 79. He was educated at Aberdeen, where he graduated M.B. and C.M. in 1866 and M.D. in 1870. He entered the I.M.S. as assistant-surgeon in 1867, and retired in 1894. He served in the Abyssinian war of 1868, at the general hospital at Zoola, receiving the medal; in the second Afghan war of 1879–80, when he took part in the defence of Kandahar, the sortie of Deh Khoja, and the battle of Kandahar on September 1st, 1880; was mentioned in dispatches, and gained the medal with a clasp; and in Burma in 1886–88, when he got the medal with two clasps.

Universities and Colleges.

UNIVERSITY OF LONDON.

A MEETING of the Senate was held on March 24th. It was resolved to institute a university chair of physiology at St. Mary's Hospital Medical School.

Professor A. D. Waller, F.R.S., was re-elected director and Dr. T. D. Lister treasurer of the Physiological Laboratory for 1920.

Dr. Philip Hamill has been appointed a member of the Board of Examiners in Pharmacology for the second examination for medical degrees, Part II, vice Dr. E. Mellanby, resigned, and Dr. F. Ransom has been elected chairman of the board for the remainder of the session 1919-20.

Dr. W. G. Savage has been appointed an external examiner in hygiene and bacteriology for the university diploma in household and social science in July, 1920. Professor E. Mellanby will give a course of eight lectures on nutrition at the Household and Sanitary Science Department, King's College for Women, Campden Hill Road, on May 3rd, 4th, 10th, 11th, 17th, 18th, 31st, and June 1st, at 5 p.m.

Presentation day will be held in the Royal Albert Hall on Wednesday, May 19th, and not May 5th, as formerly arranged. A service will be held at Westminster Abbey at 6 p.m., and a graduation dinner will be held in the evening at the Guildhall.

Applications for the Beit fellowships for scientific research to be awarded in July, 1920, must be received by the Rector, Imperial College, South Kensington, S.W.7, by April 19th.

KING'S COLLEGE OLD STUDENTS' ASSOCIATION.

At a general meeting of old students, held recently at King's College, Strand, it was decided to form the King's College, London, Old Students' Association, for the purpose of promoting social intercourse, and of keeping the members in touch with their old college. The association hopes to include students from all faculties, and the subscription of 10s. 6d. per annum will include the *King's College Review*, published once a term, and a list of members with their addresses (and possibly the work on which they are engaged). This should prove to be of great value to members wishing to renew acquaintanceship with contemporaries who may be in the same locality as themselves. Further particulars and forms of application for membership may be obtained from Miss M. A. V. Fairlie, Honorary Secretary, 3, St. Julian's Farm Road, West Norwood, S.E.27.

Medical News.

PROFESSOR STARLING, who has gone to India to advise the Government with regard to the foundation of a central medical research institute for India, will visit Bombay, Poona, Bangalore, Calcutta, Delhi, and Kasauli. He will be accompanied on his tour of inspection by Lieut.-Colonel Greig, C.I.E., I.M.S.

COLONEL C. PYE OLIVER, C.M.G., M.D., Assistant Director of Medical Services, Home Counties Division, has been appointed to the Commission of the Peace for the County of Kent.

A COURSE of ten lectures on the theory and application of mathematical statistics to social, educational, economic, meteorological, and medical problems will be given by Dr. E. C. Snow, M.A., at the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C., during the summer term. The first lecture will be given at 7 p.m. on Friday, April 23rd. The fee for the course is 5s.

DR. A. T. SCOTT, M.B.E., Assistant Commander of the Y Division, Metropolitan Special Constabulary, has been appointed an honorary associate of the Order of St. John of Jerusalem, in recognition of his services to the wounded, etc., during the air raids.

OWING to the increase of the cost of labour and materials—steel alone has risen 50 per cent. since the armistice—the prices of the Austin "Twenty" cars have been raised to £695 for the touring car and £875 for the landaulette. The price of the chassis only is £550.

THE fuel difficulty lends interest to the announcement by the Department of Scientific and Industrial Research that the Board of Trade has issued a licence to the Scottish Shale Oil Scientific and Industrial Research Association, which is found to comply with the conditions laid down in the Government scheme for the encouragement of industrial research.

A SCHOOL of puericulture in connexion with the Faculty of Medicine will shortly be inaugurated at the Edith Cavell Hospital in Paris. The school will be under the direction of Professor Pinard, and will consist of three sections—pre-natal period, infancy, and childhood—under the charge of Professors Couvelaire, Marfan, and Léon Bernard respectively.

AT a meeting of the Child Study Society on Thursday, April 29th, at 6 p.m., Sir A. E. Shipley, G.B.E., D.Sc., F.R.S., will give a lecture, illustrated by lantern slides, on biting insects and children. The lecture will be given at the Royal Sanitary Institute, 90, Buckingham Palace Road, S.W.1.

A LIEBIG museum was opened at Giessen on March 26th, when an address was given by Professor Burger on the relation of Liebig to medicine.

THE University of Louvain has been reopened, and 3,141 students have been enrolled in the various faculties.

THE thirty-second meeting of the Deutsche Kongress für Innere Medizin will be held on April 20th–23rd in Dresden under the presidency of Professor Minkowski. The chief subject for discussion will be the present position of immunotherapy and chemotherapy in infectious diseases. Professors Kraus, R. Schmidt, Pfeiffer, and Morgenroth will take part in the discussion.

M. EMILE J. B. BAILLIÈRE, the head of the well-known medical publishing firm of Paris, has recently died at the age of 89.

AT the Serum Institute in Copenhagen investigations are being conducted into the various types of pneumococcus existing in Denmark. Danish practitioners are urged to send specimens of sputum from their pneumonia cases, and pus from cases of otitis and other suppurative conditions that may be due to pneumococci. It is intended to prepare specific serums.

A COMMISSION appointed by the Swedish Government has recently issued a report in which the introduction of compulsory insurance against sickness is unanimously advocated. Maternity insurance is also recommended. It is calculated that 80 per cent. of the total population will be included in this scheme. The highest and lowest daily sickness benefits will be 10 kr. and ½ kr. respectively. It is anticipated that the annual cost of medical treatment and drugs will be 39 million kr., medical benefit will cost 60,800,000 kr., maternity benefit 11 million kr., administration 7½ million kr., the total cost being about 118,300,000 kr. On this basis the State would contribute 73½ million kr., the remainder being found by the insured, with the exception that employers would contribute to cover certain risks.

THE National Health Week for 1920 is to begin (after six years' suspension) on May 2nd. Its object is to focus public attention on matters of health, and arouse a sense of individual responsibility among all sections of the community. The improvement of health is held to be "fast approaching its limit on present lines," and the dominant idea for 1920 is to be "self-help, and the consideration of what each individual can do for himself and his neighbour in securing a healthy life." The King and Queen are patrons of the movement, and the preliminary committee includes the names of twenty medical men and women prominently associated with public health and kindred branches of medical science. Local committees are to be organized, and the Health Week Committee has many suggestions to make concerning lectures, exhibitions, demonstrations, etc. The secretary is Mr. E. White Wallis, Royal Sanitary Institute, 90, Buckingham Palace Road, S.W.

IN a paper on industrial lighting and its relation to efficiency, read before the Royal Society of Arts, Mr. Leon Gaster quoted some recent statistics collected by one of the large American insurance companies. It was estimated that of 91,000 accidents in 1910, 23.8 per cent. were due to imperfect illumination; after eight years' propaganda work on the lines of "safety first" this proportion was reduced to 18 per cent. During these eight years an aggregate of 100,000 years of work has been lost to industry through accidents which might have been prevented had the illumination been efficient. In the United States it has been calculated that increased expenditure on the lighting of factories, amounting to not more than 5 per cent. of the pay roll, would lead to an increased production of quite 15 per cent. That particular phase of industrial lighting which concerns the illumination of mines was the subject of a paper by Dr. T. Lister Llewellyn at the meeting of the Illuminating Engineering Society on February 25th, reported in our issue of March 6th, p. 327. At that meeting, which was attended by members of the Council of British Ophthalmologists and of the Ophthalmological Section of the Royal Society of Medicine, it was suggested that the question should be thoroughly studied by a joint committee representative of the three bodies. The suggestion is being placed before the Home Office, where a committee on miners' lamps is now sitting.

Letters, Notes, and Answers.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2631, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediscera, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

QUERIES AND ANSWERS.

H. E. B. desires to hear of suitable home in apartments for an elderly gentleman suffering from epilepsy, and his wife. Very moderate means.

H. G. asks for authenticated examples dating before 1914 of several persons under one roof contracting pneumonia in a manner which has recently become common.

INCOME TAX.

B. C. G. inquires whether he is entitled to deduct cost of keep from any income derived from occasional resident patients.

*** The "income" so derived is the profit, and the cost of food, laundry, domestic service, and similar expenses incurred on behalf of the resident patients can without doubt be properly deducted from the gross receipts in calculating the profit.

TRADE TEACHING FOR FEEBLE-MINDED YOUTH.

F. M.—The most appropriate place for a feeble-minded youth of 20 to be sent to "learn a trade" is The Royal Earlswood Institution, Red Hill, Surrey, where there is a series of workshops for practical instruction in printing, carpentering, tailoring, shoemaking, matmaking, etc., besides a farm and large gardens and grounds for outdoor work. Particulars can be obtained from the Secretary, H. Howard, Esq., Earlswood Offices, 14-16, Ludgate Hill, E.C.4. Payments vary according to means of parents and class of accommodation required.

ANAESTHESIA IN EPILEPTICS.

DR. C. LANGTON HEWER (Assistant Anaesthetist to St. Bartholomew's and to St. Andrew's Hospitals) writes: With reference to Dr. Cohen's letter *re* anaesthesia in epileptic subjects (p. 526), I might mention that some four months ago I anaesthetized an epileptic, who had two distinct seizures on the operating table. The first occurred just as the surgeon had begun, and the second about a quarter of an hour later. They consisted of clonic spasms of most of the voluntary muscles, and were sufficiently pronounced to stop the operation while they lasted. They were quite different in character from the fairly frequently observed "ether clonus," and lasted about two minutes. No initial tonic stage was observed. The patient was a young man who was being operated upon for tuberculous cervical glands. The anaesthetics used were gas and ether for induction, and then a mixture of C_1E_4 on an open mask. The patient made a good recovery, and had no more fits while in hospital.

DR. A. M. BARFORD (Chichester) writes: During the time I was giving anaesthetics in London I had occasion to administer to four epileptics. On each occasion I gave chloroform only, and there was no seizure during or after the administration. The patients were acute abdominal cases. Recently I had occasion to operate upon an epileptic child for tonsils and adenoids. The usual ether and chloroform mixture was used, and there was a marked seizure before and after the operation. Dr. Cohen's cases are interesting, as I have always thought epileptics could not tolerate ether.

DR. J. PEREIRA GRAY (Exeter) writes: The following experience of mine may be of interest to Dr. H. M. Cohen. On January 3rd last I was summoned to the Exeter Poor Law institution to deliver a woman, aged 22, whose labour was unduly prolonged. I found an occipito-posterior position. I gave chloroform and delivered. The anaesthetic was discontinued, the woman was lying quietly on her left side, and I was waiting for the expulsion of the placenta. Suddenly she stopped breathing, began to twitch, and then was convulsed. In fact, she had a typical epileptic fit. At its height a smart haemorrhage ensued, and the placenta was expelled. The whole affair took place between two and three minutes. She passed again into quiet anaesthetic sleep. There was never any albumin in the urine. Mine was a case, not of anaesthesia in epileptics, but of an epileptic fit in anaesthesia. The woman stated she was not subject to fits.

LETTERS, NOTES, ETC.

LENGTH OF GESTATION.

"M.R.C.S.," writing with reference to the correspondence on the length of gestation which appeared in the JOURNAL last year, sends the following facts: Last April I menstruated from April 24th to 28th inclusive. There was only one day during the following month on which connexion took place, this being May 2nd. Our baby, the fourth child, was born at 1 a.m. on February 3rd, 1920.

QUADRUPLETS.

M. PINARD reported recently to the Académie de Médecine a case in which quadruple pregnancy was brought to a successful termination. The children (two boys and two girls) were born on January 17th, 1915, have grown well, and were all alive on their fifth birthday. The mother was attended by a midwife (Madame Verdon) and Dr. Crouzat. The first child, a girl, which presented by the head, was born at 4 a.m. and Dr. Crouzat assisted delivery by forceps. The second child, a boy, which presented by the breech, was born an hour and a half later. In another half hour a third child, a girl, which presented by the breech, was born, and the fourth child, a boy, which presented by the breech, was born two and a half hours after the birth of his eldest sister. The three younger were born without instrumental assistance. Twenty minutes after the birth of the fourth severe haemorrhage occurred; it was treated successfully by delivering the placenta and the injection of hot water. The placenta was single, very large, and presented four distinct sacs. The mother suffered during the last month of pregnancy from the great size of the abdomen and from oedema in the lower part of the abdomen, the vulva, and legs. The urine did not contain albumin. She had previously had six children, born singly after normal confinements. A very complete family history was obtained, and on the side of neither parent was there any record of previous multiple pregnancies. M. Pinard stated that in France, according to Puech, quadruplets occurred once in 2,074,306 pregnancies.

ADVERTISING'S ARTFUL AID.

THE art of advertising is developing, and there are, we believe, schools where professors give instruction. The day of the simple-minded advertiser who tries to "direct attention to the subject" by using three or four sizes and kinds of type in as many lines is passing. The modern advertiser employs other methods. A word of praise may be given to the ingenuity of a little publication recently issued by Messrs. Oppenheimer. It consists of a number of more or less familiar proverbial sayings, with recommendations of the firm's products dropped in here and there; the author has so ingeniously arranged matters that the collocation of proverb and recommendation is sometimes distinctly amusing, so that the reader will be disposed to show his discoveries to friends. For instance, "All our geese are swans," "A therapeutic consideration of Roboleine supports all claims for it as *the* reconstructive." Or, again, "Bread is the staff of Life," "By its palatability and general excellence has taken high rank." Again, "For hope is but the dream of those that wake." "Favourably spoken of in relieving bronchial catarrh, asthma, and irritable winter coughs." And finally, Mark Twain and the BRITISH MEDICAL JOURNAL.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 35, 38, 39, 40, 41, and 42 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 35 and 37.

THE following appointments of certifying factory surgeons are vacant: Hebden Bridge (York, West Riding), Liskeard (Cornwall), Markfield (Leicester), Singleton (Sussex), Stonehaven (Kincardine), Stornoway (Ross and Cromarty), Wolverhampton (Stafford).

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	7	6
Each additional line...	0	1	3
Whole single column	6	0	0
Whole page	16	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.